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THE RELATIONSHIP BETWEEN LONGHAND PENMANSHIP AND SHORTHAND WRITING

Ruth Maxine Payne
Kansas State Teachers College of Pittsburg

THE RELATIONSHIP BETWEEN LONGHAND PENMANSHIP AND SHORTHAND WRITING

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by

Ruth Maxine Payne

KANSAS STATE TEACHERS COLLEGE
Pittsburg, Kansas

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ABSTRACT

The purpose of this study is to determine the predictive value of longhand penmanship for success in Gregg Shorthand writing.

The longhand tests consisted of copying the first four sentences of Lincoln's Gettysburg Address; the shorthand specimens were obtained from copying the entire Address. The rating scale selected for classifying longhand samples was the Ayres Handwriting Scale by Leonard P. Ayres, while the shorthand specimens were rated by Hoke's Shorthand Penmanship Scale.

Three longhand specimens were secured from each pupil, one at the first of the year, one at the beginning of the second semester, and one at the conclusion of the school year. The shorthand specimen was obtained at the end of the year, together with the causes for withdrawals from shorthand. These tests were administered to 676 Shorthand I students, who represented thirty high schools in the state of Kansas. The students were composed of 662 girls and 14 boys, 628 righthanded students and 48 lefthanded students.

The correlations obtained between the speed of writing shorthand and longhand (.6372 $\pm$ .0154) and between the quality of writing shorthand and longhand (.6808 $\pm$ .0139) are sufficiently high to be of predictive value.

The relationship between the speed and quality of longhand writing is too small to be of any significance. Speed and quality of shorthand writing also correlated near zero.

Lefthanded students write slower and less legible longhand and shorthand than righthanded students. Boys write longhand and shorthand with a lower degree of quality at a slower rate of speed than do girls.

The quality of longhand penmanship deteriorates slightly after studying shorthand; the speed of writing longhand increases considerably during the same period of time.

Of the students who withdrew from shorthand, 57.61% did so because of the difficulty of the subject.

The correlations obtained between the speed and quality of longhand and shorthand writing are significant. Further consideration of longhand penmanship might prove its usefulness as a part of a battery of tests for predictive and selective purposes.

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CHAPTER I

INTRODUCTION

Statement of the Problem

It is the purpose of this study to determine the possible predictive value of longhand penmanship as a means for measuring success in Gregg Shorthand writing.

Specific Problems of the Study

Although the present study will not attempt to construct a prognostic test, it will attempt to determine the possible relationship between the writing of longhand and shorthand, based upon penmanship exclusively. The specific problems of this investigation are as follows:

1. To determine the correlation between the writing of longhand and shorthand, and from the correlation obtained, attempt to answer the following questions:
   (1) Will the expert longhand writer achieve the same degree of success in the writing of shorthand?
   (2) Is the poor writer of longhand likely to become equally as poor a writer of shorthand?
   (3) Is there a correlation between the speed of longhand penmanship and shorthand writing? Can it be

said that the person who writes longhand at a fast rate of speed will write shorthand at a correspondingly rapid rate? Will the slow writer of longhand also write slow shorthand?

(4) Does the speed of writing longhand and shorthand affect the quality of penmanship? Is the quality of writing degenerated as the speed of writing increases?

2. To determine the correlation between the longhand and shorthand penmanship of lefthanded students with the same criteria of righthanded students. The following questions are raised:

(1) Can it be said that lefthanded students write slower and less legible longhand than righthanded ones, as is the common belief?

(2) Do lefthanded students write poorer shorthand than righthanded students, due to the fact that Gregg shorthand outlines involve fundamentally the same movements as longhand letters, which they frequently resemble?

(3) Will the lefthanded student write shorthand at a slower rate of speed than the righthanded one?

3. To determine if shorthand writing affects the student's longhand penmanship. Does the quality of a student's handwriting deteriorate after a course of shorthand?

Will the writing of shorthand cause an increase in the student's speed of writing longhand?

4. To compare the shorthand and longhand writing of boys with the same criteria of girls, and from this comparison, attempt to answer the question: Do boys have an ability to write shorthand, comparable to that of girls?

5. To determine the reason for the smaller enrollment in shorthand courses at the end of a school year, compared to that at the beginning of the year. Do students withdraw from shorthand because of its difficulty? Will students take such a step as to change their curriculum because of the difficulty of writing shorthand?

Need for the Study

It is well known that many students fail in almost every school subject. It seems unfortunate that a student should be permitted to undertake a course in which there is little chance for him to succeed. This is not only a waste of effort for both the teacher and the student, but it prevents the student from using his time for the acquisition of something else that is within his capacity. If it were possible to predict with success which students would be successful in shorthand, it would be advantageous to both the student and the teacher. Moreover, a system of selecting apt candidates for shorthand classes would reduce school costs. This would be advantageous to the administrators of the school and to the entire community.

The need for prognostic testing is illustrated by the following statement by F. G. Nichols:

> Failure to function as a stenographer after devoting two or more years to shorthand study in high school, or a year or more to its study in a business college, must cause discouragement and occupational floundering before a satisfactory adjustment is made.[1]

Because, according to Leslie[2], a study of shorthand can be justified by very little other than vocational objectives,

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[1]Frederick G. Nichols, Commercial Education in the High School (New York: D. Appleton-Century Company, 1933), p. 212.

[2]Louis A. Leslie, "Shorthand Testing and Grading," Better Business Education (New York: Gregg Publishing Co., 1942), p. 211.

it is reasonable to assume that only those students who are likely to succeed should be encouraged to enroll in the course.

S. J. Turille states:

> Entrance standards into commercial skill subjects should be determined and prognostic tests should be administered early to determine individual vocational aptitudes.[3]

Although there appears to be a need for prognostic tests in shorthand, they seem to be few in number. The several tests that have made their appearance on the market have not proven too successful. P. L. Turse, in an article discussing the problems of prognosis in shorthand states:

> There seems to be no generally accepted standard criterion against which the various prognostic tests have been correlated and, therefore, no measure of the comparative reliability of proposed prognostic tests exists. Should the criterion of achievement lie in so subjective a measure as teachers' marks? The unreliability of teachers' marks has long been known, yet investigations still are occasionally reported in which this measure has been used as the criterion in shorthand prognosis.
>
> Should the criterion lie in the mastery of shorthand symbols of a given system as measured by theory tests? While, no doubt, there is some relationship between symbol accuracy and transcript accuracy, the shorthand outline is only a means to an end. Therefore, a theory test in itself would seem to be a highly questionable criterion.[4]

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[3]S. J. Turille, "Performance Standards in Secondary School Vocational Commercial Education," Balance Sheet, XXI (September, 1941), 6.

[4]Paul L. Turse, "Problems in Shorthand Prognosis," Journal of Business Education, XIII (May, 1938), 17-18.

Although studies have been made, attempting to predict shorthand success, no one has been successful in establishing definite standards for the various abilities. It is statements such as the following by E. G. Blackstone, that enlighten the seemingly unpromising future of prognostic testing.

> We need not be discouraged about the complexity of prediction. Our combined efforts along these lines cannot fail to provide progress, and every little gain is distinctly worth while.[5]

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[5]E. G. Blackstone, "Prognosis in Business Education," Business Education World, XIX (March, 1939), 533.

Limitations of the Study

The basic assumption must be made that factors other than legibility and rapidity in longhand writing enter into the ability to write legible and rapid shorthand, possibly such factors as interest, effort, desire for success, and certain physical factors.

The present study is limited to specimens of longhand and shorthand writing of high school pupils only. Samples were secured from groups studying Shorthand I; i. e., the first year course, during the year 1949-1950. Gregg Shorthand has been chosen for comparison with longhand, because, according to Gregg[6], the salient factors underlying the Gregg Shorthand system adhere to the same general principles governing ordinary writing.

As one of the purposes of this study is to correlate the longhand and shorthand writing ability of lefthanded students with the same criteria of righthanded students, the study was delimited to those schools whose shorthand classes contained lefthanded subjects. Twenty-nine schools, out of the 63 schools who offered their cooperation, fulfilled this qualification. Crawford Community High School at Cherokee, Kansas was included with the schools taking part in the study. Although Cherokee, Kansas is a third class city, it was felt

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[6]John Robert Gregg, Gregg Shorthand (New York: The Gregg Publishing Company, 1929), p. x.

that the school should be included because the writer is an instructor in that school system.

The study was further limited to the extent of using one form of measurement of shorthand and longhand, that resulting from scoring by means of rating scales. The rating scale selected for classifying longhand samples was the Ayres Handwriting Scale by Leonard P. Ayres, published by the Public School Publishing Company. The shorthand specimens were rated by Hoke's Measuring Scale for Gregg Shorthand Penmanship, published by The Gregg Publishing Company.

Definition of Terms

A number of different ways have been proposed to express the relationship between several tests. The Pearson Product-Moment method is by far the most common and is, on the whole, the basic method used in educational investigations.[7] The result of the method is a coefficient of correlation, which expresses the relationship between two or more variables.

The coefficient of correlation, indicated by r, may vary all the way from ±1.00, indicating perfect positive relationship, through all of the possible decimals to zero (0), indicating no relationship whatever, to -1.00, indicating a perfect negative relationship. Thus, if there is a correlation of ±1.00 between two tests, an individual receiving the highest score on one test should also receive the highest score on the other test. Those individuals who tend to be at or near the average on one test tend also to be at or near the average on the other. When this is true, the two tests are said to be "perfectly related" or they show a "positive correlation." A correlation of -1.00 between two tests indicates a negative relationship. This means that an individual receiving the highest score on one test would probably receive the lowest score on the other test. A correlation of zero (0), would, of course, mean that there was no relationship between the two tests.

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[7]Harry A. Greene, Albert N. Jorgensen, and J. Raymond Gerberich, Measurement and Evaluation in the Secondary School (New York: Longmans, Green & Co., 1943), p. 555.

The probable error of a coefficient of correlation indicates the limits of the accuracy of the coefficient. For example, the statement that an obtained coefficient is .34 ± .02 would mean that the relationship between the two variables was found to be .34 and that, under ordinary circumstances, the coefficient will always fall within .32 and .36 (.02 more or .02 less). Regardless of the number of times the coefficient is obtained between the variables under consideration, the coefficient will practically always fall within the limits set by the probable error, provided the data is obtained under similar circumstances.[8]

Rank Correlation is a method of computing the relationship between two variables by ranking the scores for each of the variables considered rather than using the magnitudes themselves. The difference is then found, for each individual, between the ranks of each of the two variables. These differences are squared and then totaled.[9] The rank difference correlation coefficient is then applied: $\rho = \frac{1-6d^2}{N(N^2-1)}$

A frequency distribution is a tabulation showing the number of times each variable occurs in the given data. Often times, the frequencies are shown by tally marks.

A percentile is that point of a frequency distribution below which a given percentage of the scores occur. The

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[8]R. A. Fisher, Statistical Methods for Research Workers (New York: Hafner Publishing Company, 1948), p. 50.

[9]Irving G. Gavett, A First Course in Statistical Method (New York: McGraw-Hill Book Company, Inc., 1925), p. 243.

percentile is named for the percentage of cases which are below it. For example, if it is said that 34.67 is the seventy-fifth percentile of a given distribution, it should be interpreted as meaning that 75% of the scores are below 34.67.

The median is that point of a frequency distribution below and above which exactly 50 per cent of the scores occur. Thus, a median of 65 would mean that just fifty per cent of the scores in the distribution are above and below the score 65.

A quartile is one of the three points which divide a frequency distribution into four parts, each containing exactly one-fourth of the cases. The first quartile is the twenty-fifth percentile, the second quartile is the median, and the third quartile is the seventy-fifth percentile.

The arithmetic mean, sometimes referred to as the "average", is found by totaling the scores in a series and dividing by their number. For example, the arithmetic mean of the numbers 24, 33, and 45 would be found by finding the sum of the numbers and dividing by three, thus:

$$\begin{array}{r} 24 \\ 33 \\ \underline{45} \\ 102 \end{array} \qquad \frac{102}{3} = 34 \text{ (arithmetic mean)}$$

Related Literature

An interest in the phenomena of prognosis is by no means new. As a result of the tremendous increase in enrollment in courses in shorthand during recent years, considerable interest has been aroused in predicting the success of students who enroll for this subject. Investigations have been carried out with the purpose of predicting the probable success of a student by the means of preliminary tests. A summary of some of these studies is presented in this section.

One of the earliest studies in this field was made by O. A. Ohmann of the Department of Psychology of the University of Iowa in 1926. The purpose of his work was to formulate a group of tests of mental ability that would measure the capacity of an individual to develop skill in stenography. The following tests were selected to measure that capacity.

1. Motility test
2. Language test
3. Following directions test
4. Memory span test
5. Substitution test
6. Vocabulary test
7. General intelligence test
8. Spelling test

9. Handwriting test

10. Rating scale of character traits

In the findings, the resulting correlations were very low (0 to ± .36). The writer found, however, that a combination of several of these tests increased their predictive value. The five tests correlating highest with his criterion for success in stenography were Motility, Language, Vocabulary, Intelligence and Spelling (.61).[10]

In 1927, C. E. Limp conducted a study to attempt to formulate a battery of tests for predicting success in both shorthand and typewriting. Five tests were used in order to obtain prognosis in shorthand.

The first test was a test for logical selection. Terman's Group Test of Mental Ability was used with a resulting correlation of .33. The second was a sentence meaning test. Terman's Group Test of Mental Ability was again used. The correlation was .06. The third test was a recognition spelling test. The Hoke Prognostic Test of Stenographic Ability was used with a correlation of .53. The fourth test used was a Courtes Multiplication test with a resulting correlation of .40. The fifth test was a word meaning test. Another Terman Group Test of Mental Ability was used, with a correlation of .05.[11] This writer believes that a weakness

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[10]O. A. Ohmann, "The Possibility of Prognosis in Stenography" (unpublished master's thesis, University of Iowa, 1926).

[11]C. E. Limp, "A Work in Commercial Prognosis," Journal of Educational Research, XVI (1927), 48-56.

of Mr. Limp's work is that more tests measuring other shorthand abilities should have been used.

R. J. Worley, in his study, "Prognosis in Shorthand", made in 1931, found that English marks did not show ability in shorthand traits, except for use in spelling, grammar and punctuation. He also found that I. Q. has no predictive value of shorthand success.

In his results, foreign language ranked first in the correlation of marks. Marks in science, mathematics and English had approximately the same low correlation. He found that I. Q. ranked near the bottom.[12]

Rosa Colegrove, in her study made in 1933, claimed that the I. Q. is not a reliable prediction of speed in shorthand. Her work attempted to make a correlation between general intelligence and speed of writing shorthand. The resulting correlation was near zero.[13]

Marguerite Goen conducted an experiment in 1934 to determine the effectiveness of penmanship drills in writing shorthand. She found a zero correlation each time longhand quality was concerned.

The writer first correlated the transcription ability of 53 students with the quality of longhand of the same students. The correlation was -.00029 with a P.E. of .09. This

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[12] R. J. Worley, "Prognosis in Shorthand," Journal of Business Education, VI (1931), 15-16.

[13] Rosa Laramie Colegrove, "The Relation of Intelligence to the Learning of Shorthand and Typewriting" (unpublished master's thesis, University of Wyoming, 1933).

indicates that there is no relationship between a student's transcription ability and the quality of his longhand penmanship.

Miss Goen then correlated the transcription ability of the students with the speed of writing longhand. Here the findings were more significant. The correlation was .3153 with a P.E. of .08. This indicates a degree of relationship between the student's transcription ability and his speed in writing longhand.

She then computed the correlation between quality of longhand penmanship and speed of longhand writing. The result was -.0484, which is practically zero. She also found a comparatively low correlation between transcription ability and quality of shorthand penmanship.[14]

The purpose of the work of Nathan R. Fox, in his thesis "Prognosis of Stenographic Ability", written in 1936, was to correlate shorthand grades with grades received in other subjects.

As a result of his work, the author found the highest correlation with foreign language marks (.55 P.E. .03). English grades ranked second with a correlation of .54 P.E. .02. I. Q. ranked lowest with a correlation of .34 P.E. .03.[15]

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[14]Marguerite Goen, "The Effectiveness of Penmanship Drills in Shorthand I" (unpublished master's thesis, State University of Iowa, 1934).

[15]Nathan R. Fox, "Prognosis of Stenographic Ability" (unpublished master's thesis, Temple University, 1936).

Perhaps the major defect of his work was the standard of correlation he used. Too often the marks given by teachers involve other factors than achievement in the subject.

In 1936, Elizabeth Kessinger conducted an experiment to determine the relationship between certain preliminary tests and success in shorthand. She gave the Hoke Prognostic Test of Stenographic Ability to 86 students in the fall of 1935. She then gave the Pressey Diagnostic Test in English Composition and the Terman Group Test of Mental Ability to the same students. The resulting correlations were all comparatively low (.28 to .464). She then took the average of all marks received by the students in major subjects. This correlation was substantial (.594). She found that the criteria, as a group, have slightly more value than any one test taken alone.[16]

Perhaps the best study yet made to determine how important longhand penmanship and general intelligence are in determining shorthand success was that of Marian Elizabeth Miller, who did her study at the University of Cincinnati in 1937.

Miss Miller undertook to determine the correlation of achievement between the writing of longhand and shorthand and from the correlations to decide if it is possible to predict

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[16]Elizabeth Kessinger, "A Prognostic Study in High School Shorthand" (unpublished master's thesis, Louisiana State University and Agricultural and Mechanical College, 1936).

the degree of achievement a student will attain in the writing of shorthand.

Specimens of longhand and shorthand writing were secured from 430 students attending Cincinnati high schools during the first semester of 1936-1937. Four specimens of handwriting were secured from each pupil, two of longhand and two of shorthand. The material for the first specimen were chosen from literature, part of which was an excerpt from Lincoln's Gettysburg Address. The second specimen consisted of letters dictated to the students. One of the longhand samples was written from dictation; the other was copied from mimeographed material. The shorthand sample for the first letter was obtained from dictation, given slow enough so that all students could take it without hurrying. The second letter was dictated at 50 words a minute. One of the shorthand samples was taken from dictation; the other was copied from longhand.

The rating scale selected for classifying longhand samples was the American Handwriting Scale, by West. The shorthand specimens were rated by the Measuring Scale for Gregg Shorthand Penmanship by Elmer Hoke.

A total of 860 samples of longhand writing and 860 of shorthand writing were obtained. One-half the specimens were from dictation and one-half from copied material. It should be noted here that this was a study in shorthand penmanship exclusively.

The specimens were divided into eight groups, those for first-year shorthand students (two for Shorthand I and two for Longhand I) and those for second-year shorthand students (two for Shorthand II and two for Longhand II). The correlations found were:

Specimens of Writing	Cases	r	P.E.
Shorthand I, copied:			
Longhand I, copied	294	.47	.03
Shorthand I, dictated:			
Longhand I, dictated	294	.52	.028
Shorthand II, copied:			
Longhand II, copied	136	.55	.04
Shorthand II, dictated:			
Longhand II, dictated	136	.61	.036

The above positive correlations seem to indicate a substantial relationship between the writing of shorthand and longhand. The author states, however, that, although a positive correlation was found, the data were not sufficient to predict success in shorthand on the basis of ability in longhand alone. Other factors enter into achievement in shorthand. Therefore, it is not possible to predict with accuracy whether a student will attain the same degree of success in writing shorthand as in writing longhand.

A low degree of correlation was found between intelligence and shorthand writing scores (below .20). The author concluded, therefore, that intelligence scores could not be used alone to predict probable success in shorthand achievement.[17]

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[17]Marian Elizabeth Miller, "The Value of Longhand Penmanship and General Intelligence in Predicting Achievement in Gregg Shorthand Penmanship" (published master's thesis, Teachers College of the University of Cincinnati, 1937).

The work conducted by Paul L. Turse in 1938 discussed the problems involved to prepare a suitable prognostic test for shorthand. The factors that he stated that should be considered in preparing any kind of prognosis for shorthand are:

1. I. Q. and English grade
2. Vocabulary test
3. Manual dexterity
4. Studies in other fields of prognostic testing.

The author did not conduct any experiments himself. He concluded that there are no generally accepted standards in shorthand. A test on shorthand theory is not enough on which to base conclusions. He concluded further that the important thing in shorthand is a correct transcription of the shorthand. The accuracy of the shorthand symbols are unimportant, so long as they are correctly transcribed into English.[18]

In 1940, Gerald Mandell made a study with the purpose of assembling tests and determining their validity and reliability for use for prognostic purposes for pupils enrolling in the shorthand course.

The principal findings of the study were stated in terms of the correlation between these criteria and success in shorthand. The correlations were as follows:

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[18]Turse, op. cit., p. 18

1. Shorthand and vowel sound test, .57 P.E. .042
2. Shorthand and phonetic spelling test, .53 P.E. .045
3. Shorthand and reading test .438 P.E. .05
4. Shorthand and intelligence quotients, .394 P.E. .054
5. Shorthand and English grades, .296 P.E. .055
6. Shorthand and substitution test, .292 P.E. .063
7. Shorthand and speed of writing test, .275 P.E. .057
8. Shorthand and spelling test, .247 P.E. .062
9. Shorthand and coordination test, .161 P.E. .059
10. Shorthand and memory test, .141 P.E. .06
11. Shorthand and grammar test, .01 P.E. .071

The above correlations indicate that speed of writing, spelling, coordination, memory and knowledge of grammar offer little aid in predicting shorthand success.

The author then gave a battery of tests to determine if a combination of criteria would have more predictive value than any one test given alone. The most desirable battery obtained from the study consisted of: the vowel sound test; the phonetic spelling test; the reading test and intelligence quotients.[19]

Conclusions

The studies reviewed all agree in showing a low correlation between intelligence and ability to learn

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[19]Gerald Mandell, "Prognosis in Shorthand" (unpublished master's thesis, Temple University, 1940).

shorthand, and hence, that intelligence alone is not a valid basis for predicting achievement in shorthand. Furthermore, the studies are not in agreement as to any one test, or battery of tests to be used for predicting probable success in shorthand. Perhaps this is due to the small number of cases studied and the subjectivity of the criteria used.

Since, apparently, only one study has been made comparing the writing of longhand and shorthand, the writer feels justified in including with this study a verification of the positive correlation found.

It appears that no studies have yet been made comparing the writing of longhand and shorthand of lefthanded students with the longhand and shorthand writing of righthanded students. Therefore, the writer proposes to make an investigation into that field.

CHAPTER II

PROCEDURE, FINDINGS, AND INTERPRETATION OF DATA

Method of Procedure

At the first of the school year 1949-1950, ninety-eight letters were sent to all schools in Kansas with a classification of "A" in 1st and 2nd class cities, as listed in the Kansas Educational Directory[1], asking the shorthand teacher to cooperate in this research study. A sample of the letter is included in the Appendix. More than two-thirds (64.285%) of the teachers responded to the request. Of the 63 letters returned, 62 reported that the teacher would be willing to help; one letter stated that the school was not offering Shorthand I this year. Approximately twelve hundred righthanded students and sixty lefthanded students were offered as subjects for the tests.

Because one of the purposes of this study is to correlate the longhand and shorthand writing ability of lefthanded students with the same criteria of righthanded students, the study was delimited to those schools whose shorthand classes contained some lefthanded students. The shorthand classes of the 30 schools fulfilling this qualification were composed of 968 girls and 22 boys, 923 righthanded students (18 boys) and 67 lefthanded students

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[1] Superintendent of Public Instruction. "Kansas Educational Directory, 1948-1949", pp. 18-36.

(4 boys). The number of subjects taking the first test totaled 990. Incomplete data, however, for 274 of the students (due to their absence from one or another of the testing periods) necessitated their elimination, leaving 676 students taking all of the tests. The 676 students were classified as follows: 662 girls and 14 boys; 626 right-handed students (11 boys) and 50 lefthanded students (3 boys).

Preparation of Forms

A total of 2,028 specimens of longhand writing and 676 of shorthand writing were obtained from the schools taking part in the investigation. The forms used to secure these samples were compiled so as to obtain four specimens of handwriting from each individual, three of longhand and one of shorthand.

The first of the series of longhand tests was administered at the beginning of the fall term. The second of the series, identical to the first, was given at the beginning of the second semester. The third longhand specimen was secured at the end of the school year. The shorthand writing test was also administered at the end of the year. A sample of each of the forms used in securing the specimens of writing is included in the Appendix. A letter was sent with each set of test forms, directing the teacher in administering the tests. A copy of each of these letters is included in the Appendix. A form was sent to each school at

the end of the year, asking the teacher to check in one of several columns provided, the reason why several of her students did not continue studying shorthand beyond one semester. A sample of this form is included in the Appendix.

The material for the longhand and shorthand specimens was chosen from literature, Lincoln's Gettysburg Address. Material for the shorthand specimen consisted of copying the entire Address in shorthand. An excerpt from Lincoln's Gettysburg Address (the first four sentences) was copied by the students in longhand at each of the three testing periods. Each of the four tests had a time limit of 2 minutes, which is insufficient time for the great majority of the students to finish writing the previously described material.

Description of Rating Scales Used

Many handwriting scales are available for measuring the quality of penmanship of the writer. Although these scales differ in certain respects, all of them have the common characteristic of exhibiting varying degrees of quality from the lowest to the highest. The specimens are arranged systematically in order of increasing quality by approximately equal steps. The quality of each is described numerically.

It is evident that the measure of quality is to some extent a matter of judgment. However, investigations have

demonstrated that ratings based on a scale are more reliable than unaided judgments.[2]

The shorthand specimens were classified by the Measuring Scale of Gregg Shorthand Penmanship by Elmer Hoke. The scale is published by the Gregg Publishing Company.

The Hoke Shorthand Penmanship Scale, used to measure quality of shorthand writing, is one of seven parts of the Hoke Prognostic Test of Stenographic Ability. This is the oldest test in the field, and it has been used more than any other in experimental work. The only data given in the material accompanying the scale are maximum possible scores and the mean. Research on the predictive value of the Hoke tests was done after their publication. The most significant research was done by Clyde I. Blanchard, in 1928. Mr. Blanchard conducted a study among 37 schools in 18 states, the purpose of which was to test the validity of the Hoke Prognostic Test of Stenographic Ability. The correlations obtained were uniformly low. Mr. Blanchard believed that the reason for this was, no doubt, because of the wide range of opportunities for achievement under so many teachers of varying abilities.[3]

The rating scale selected for classifying longhand samples was the Ayres Handwriting Scale by Leonard P. Ayres,

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[2]Walter S. Monroe and Ruth Streitz, Directed Learning in the Elementary School (New York: Doubleday, Doran and Co., 1932), pp. 403-404.

[3]Mathilde Hardaway, "Prognosis or Aptitude Tests for Skill Subjects," Business Education World, XXV (April, 1945), 427.

published by the Public School Publishing Company. The scale is sometimes referred to as the "Gettysburg Edition"[4] because the opening sentences of Lincoln's Gettysburg Address are used.

The Ayres Handwriting Scale is described by the following:

> This scale for measuring the quality of handwriting is a revised edition of a scale first published in 1912 and subsequently reprinted 12 times with a total of 62,000 copies. The purpose of the present edition is to increase the reliability of measurements of handwriting through standardizing methods of securing and scoring samples, and through making numerous improvements in the scale itself designed to reduce variability in the results secured through its use.[5]

Inasmuch as both of these scales measure quality of writing and are arranged in systematic degrees of quality, it was considered advisable to use them for procuring the most accurate results.

The procedure used in this study for rating the longhand and shorthand samples was to spread the scale out on a desk with all samples exposed to view. Then the writing of one pupil was "matched" with each sample on the scale until one was found which the scorer judged it to be most like.

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[4]Leonard P. Ayres, "Ayres Handwriting Scale".

[5]Ibid.

Statistical Techniques Used

The first step in handling the scores was to make a scattergram of the groups under consideration. A sample is enclosed in the Appendix. The quality range for both longhand and shorthand extended from 20 to 99.99, the range of shorthand speed extended from 30 to 230, and the speed of longhand range extended from 16-100. Coefficients of correlation for both girls and righthanded students were worked out according to Pearson's product-moment formula:

$$r = \frac{\frac{\Sigma xy}{N} - \left(\frac{\Sigma fy}{N} \times \frac{\Sigma fx}{N}\right)}{\sqrt{\frac{\Sigma fx^2}{N} - \left(\frac{\Sigma fx}{N}\right)^2 - \frac{1}{12}}\sqrt{\frac{\Sigma fy^2}{N} - \left(\frac{\Sigma fy}{N}\right)^2 - \frac{1}{12}}}$$

, coefficients of correlation for lefthanded students and boys were worked out according to the rank difference correlation coefficient: $\rho = \frac{1 - 6d^2}{N(N^2-1)}$, with the following formula being used for Probable Error:

$$P.E. = .6745 \pm \frac{(1-r^2)}{\sqrt{N}}$$

Frequency distributions for each of the tests were made for the group or groups under consideration. From these frequency distributions the medians, twenty-fifth percentiles and seventy-fifth percentiles were calculated.

Interpretation of Data

The presentation of the interpreted data will follow an arrangement similar to that used in stating the specific problems of the study, as raised in Chapter I.

Comparison Between the Speed of Writing Longhand and the Speed of Writing Shorthand. As shown in Table I, the rapidity of writing longhand and the rapidity of writing shorthand correlated .6372 ± .0154, which is a high coefficient of correlation. The correlation is high enough to indicate that apparently the ability to write longhand at a fast rate of speed is predictive to rapidity of writing shorthand.

TABLE I

COEFFICIENTS OF CORRELATION BETWEEN THE SPEED OF WRITING LONGHAND AND THE SPEED OF WRITING SHORTHAND OF SIX-HUNDRED SEVENTY-SIX STUDENTS STUDYING SHORTHAND IN THIRTY HIGH SCHOOLS IN THE STATE OF KANSAS

Participants	Cases	Coefficient of Correlation	Probable Error
All Students	676	.6372	.0154
Girls	662	.6378	.0160
Righthanded	628	.6089	.0170
Lefthanded	48	.5654	.0663
Boys	14	.6011	.0917

The relationship found between the speed of writing shorthand and longhand for girls (.6378 ± .0160), boys (.6011 ± .0917), and righthanded students (.6089 ± .0170) was very close to the correlation found for all students. The correlation obtained for lefthanded students, however, was somewhat smaller (.5654 ± .0663). Although this correlation is substantial, it would seem to indicate that the speed of writing longhand is not quite so predictive of speed of writing shorthand for lefthanded students as for students who are righthanded.

Comparison Between the Quality of Longhand Writing and the Quality of Shorthand Writing. According to Table II, the correlation between the quality of longhand writing and the

TABLE II

COEFFICIENTS OF CORRELATION BETWEEN THE QUALITY OF LONGHAND WRITING AND THE QUALITY OF SHORTHAND WRITING OF SIX-HUNDRED SEVENTY-SIX STUDENTS STUDYING SHORTHAND IN THIRTY HIGH SCHOOLS IN KANSAS

Participants	Cases	Coefficient of Correlation	Probable Error
All Students	676	.6808	.0139
Girls	662	.6722	.0144
Righthanded	628	.6770	.0146
Lefthanded	48	.6822	.0600
Boys	14	.6852	.0694

quality of shorthand writing is .6808 ± .0139, which is a high correlation. It seems to indicate that the ability to write longhand with a high degree of quality is predictive of a comparable ability in shorthand writing. The relationship found between the quality of longhand penmanship and shorthand writing was very nearly the same for all classifications of students, boys, girls, lefthanded students, and righthanded students. The coefficients of correlation are found in Table II.

Comparison Between the Speed and Quality of Shorthand Writing. The coefficient of correlation obtained from correlating the quality of shorthand writing and the rapidity of writing shorthand (-.0556 ± .0258) is too low to be of significance. The data in Table III would indicate that there

TABLE III

COEFFICIENTS OF CORRELATION BETWEEN THE SPEED OF SHORTHAND WRITING AND THE QUALITY OF SHORTHAND WRITING OF STUDENTS STUDYING SHORTHAND IN THIRTY HIGH SCHOOLS IN KANSAS

Participants	Cases	Coefficient of Correlation	Probable Error
All Students	676	-.0556	.0258
Girls	662	-.0821	.0260
Righthanded	628	-.0597	.0268
Lefthanded	48	-.0505	.0249
Boys	14	-.0337	.0161

is little, if any, relationship between speed and quality of shorthand writing. The coefficients of correlation for the various classifications of students were all near zero. Thus, the ability to write shorthand well is not predictive of the speed of writing shorthand, whether the writer be lefthanded, righthanded, boy, or girl.

Comparison Between Speed and Quality of Longhand Writing. The correlations between quality and rapidity of writing longhand are uniformily low for all classifications of shorthand students. This seems to indicate that there is little relationship between the quality of writing longhand and speed of longhand writing. The correlations obtained from the first longhand test, which was given at the first of the school year, are shown in Table IV; the correlations obtained from the second longhand test, which was given at the middle of the year, are expressed in Table V; the correlations obtained from the third longhand test, given at the end of the year, are shown in Table VI.

An arithmetic mean for each individual, derived from the three longhand tests, was computed for both speed of writing and quality of writing. Coefficients of correlation were calculated from this data. The results, given in Table VII, are very nearly the same as those found in the longhand tests taken separately.

TABLE IV

COEFFICIENTS OF CORRELATION BETWEEN THE SPEED AND QUALITY OF WRITING LONGHAND OF STUDENTS STUDYING SHORTHAND IN THIRTY HIGH SCHOOLS OF KANSAS, TEST NUMBER 1

Participants	Cases	Coefficient of Correlation	Probable Error
All Students	676	-.0905	.0257
Girls	662	-.2112	.0250
Righthanded	628	-.0929	.0266
Lefthanded	48	-.0674	.0970
Boys	14	-.0489	.0179

TABLE V

COEFFICIENTS OF CORRELATION BETWEEN THE SPEED AND QUALITY OF WRITING LONGHAND OF STUDENTS STUDYING SHORTHAND IN THIRTY HIGH SCHOOLS OF KANSAS, TEST NUMBER 2

Participants	Cases	Coefficient of Correlation	Probable Error
All Students	676	.1765	.0009
Girls	662	-.0751	.0260
Righthanded	628	-.0585	.0268
Lefthanded	48	-.1144	.0962
Boys	14	-.1132	.0180

TABLE VI

COEFFICIENTS OF CORRELATION BETWEEN THE SPEED AND QUALITY OF WRITING LONGHAND OF STUDENTS STUDYING SHORTHAND IN THIRTY HIGH SCHOOLS OF KANSAS, TEST NUMBER 3

Participants	Cases	Coefficient of Correlation	Probable Error
All Students	676	.2047	.0249
Girls	662	.0235	.0262
Righthanded	628	.0226	.0269
Lefthanded	48	-.1239	.0959
Boys	14	.0275	.0181

TABLE VII

COEFFICIENTS OF CORRELATION BETWEEN THE SPEED AND QUALITY OF WRITING LONGHAND OF STUDENTS STUDYING SHORTHAND IN THIRTY HIGH SCHOOLS OF KANSAS, COMPUTED FROM MEANS OF TESTS 1, 2, AND 3

Participants	Cases	Coefficient of Correlation	Probable Error
All Students	676	-.1228	.0256
Girls	662	-.1265	.0258
Righthanded	628	-.0929	.0267
Lefthanded	48	-.1312	.0256
Boys	14	-.0956	.0178

Comparison of the Speed of Writing Shorthand for the Classifications of Students. According to the data in Table VIII, lefthanded students write slower shorthand than righthanded students and boys write slower shorthand than girls. The data in the table below shows that boys, on an average, write approximately ten words less in two minutes, or five words less per minute than girls. The data also discloses that lefthanded students write approximately four words less than righthanded students for a period of two minutes (two words less per minute).

TABLE VIII

MEDIAN, TWENTY-FIFTH PERCENTILE AND SEVENTY-FIFTH PERCENTILE FOR SPEED OF WRITING SHORTHAND OF SIX-HUNDRED SEVENTY-SIX SHORTHAND STUDENTS IN THIRTY HIGH SCHOOLS OF KANSAS

Participants	Median	Twenty-Fifth Percentile	Seventy-Fifth Percentile
All Students	118.88	93.52	140.11
Girls	119.24	93.61	140.64
Righthanded	119.10	93.92	140.15
Lefthanded	115.50	87.83	139.50
Boys	109.50	91.17	122.00

Comparison of the Quality of Shorthand Writing for the Classifications of Students. From the succeeding table, it appears that boys write a lower quality of shorthand than girls and that lefthanded students write poorer shorthand than righthanded students. The calculated medians for girls and righthanded students were found to be almost identical to that found for all of the students combined (55.54). These data are shown in Table IX.

TABLE IX

MEDIAN, TWENTY-FIFTH PERCENTILE AND SEVENTY-FIFTH PERCENTILE FOR QUALITY OF SHORTHAND WRITING OF SIX-HUNDRED SEVENTY-SIX SHORTHAND STUDENTS IN THIRTY HIGH SCHOOLS OF KANSAS

Participants	Median	Twenty-Fifth Percentile	Seventy-Fifth Percentile
All Students	55.54	42.89	69.75
Girls	55.86	43.31	69.95
Righthanded	55.89	43.19	69.82
Lefthanded	51.67	35.00	68.33
Boys	51.00	32.50	62.50

Comparison of the Quality of Longhand Penmanship Before Studying Shorthand and After Studying Shorthand. According to the data in Table X, the quality of longhand writing degenerates after studying shorthand. Test Number 1 was given at the beginning of the school year 1949-1950, test

Number 2 at the middle of the year, and test Number 3 at the completion of the year. Although the decrease in the quartile scores is not great, it is significant that a reduction has occurred.

TABLE X

MEDIAN, TWENTY-FIFTH PERCENTILE AND SEVENTY-FIFTH PERCENTILE FOR QUALITY OF LONGHAND PENMANSHIP OF SIX-HUNDRED SEVENTY-SIX SHORTHAND STUDENTS IN THIRTY HIGH SCHOOLS OF KANSAS

Test Number	Median	Twenty-Fifth Percentile	Seventy-Fifth Percentile
1	54.42	46.91	69.08
2	54.23	45.00	68.81
3	52.97	42.62	67.76

The median, twenty-fifth percentile and seventy-fifth percentile of righthanded students and of girls are very nearly the same as those found for all students combined. The quartile scores for lefthanded students is somewhat smaller; the quartile scores for boys is considerably less. These figures are shown in Tables XI, XII, XIII, and XIV. It is evident, from this data, that boys write poorer longhand than girls and that lefthanded students write a lower quality of longhand than do righthanded students.

TABLE XI

MEDIAN, TWENTY-FIFTH PERCENTILE AND SEVENTY-FIFTH PERCENTILE FOR QUALITY OF LONGHAND PENMANSHIP OF STUDENTS STUDYING SHORTHAND IN THIRTY HIGH SCHOOLS OF KANSAS, TEST NUMBER 1

Participants	Cases	Median	Twenty-Fifth Percentile	Seventy-Fifth Percentile
All Students	676	54.42	46.91	69.08
Girls	662	54.60	47.17	69.36
Righthanded	628	54.62	47.18	69.09
Lefthanded	48	51.43	41.67	69.00
Boys	14	41.00	29.17	48.75

TABLE XII

MEDIAN, TWENTY-FIFTH PERCENTILE AND SEVENTY-FIFTH PERCENTILE FOR QUALITY OF LONGHAND PENMANSHIP OF STUDENTS STUDYING SHORTHAND IN THIRTY HIGH SCHOOLS OF KANSAS, TEST NUMBER 2

Participants	Cases	Median	Twenty-Fifth Percentile	Seventy-Fifth Percentile
All Students	676	54.23	45.00	68.81
Girls	662	54.56	45.36	69.09
Righthanded	628	54.89	43.03	67.84
Lefthanded	48	49.55	39.62	66.11
Boys	14	37.00	28.13	45.83

TABLE XIII

MEDIAN, TWENTY-FIFTH PERCENTILE AND SEVENTY-FIFTH PERCENTILE FOR QUALITY OF LONGHAND PENMANSHIP OF STUDENTS STUDYING SHORTHAND IN THIRTY HIGH SCHOOLS OF KANSAS, TEST NUMBER 3

Participants	Cases	Median	Twenty-Fifth Percentile	Seventy-Fifth Percentile
All Students	676	52.97	42.62	67.76
Girls	662	53.20	43.06	68.04
Righthanded	628	53.89	43.03	67.84
Lefthanded	48	48.64	38.85	67.00
Boys	14	37.50	30.00	50.00

The arithmetic mean of test Numbers 1, 2, and 3 was obtained for each of the 676 students. The median, twenty-fifth percentile and seventy-fifth percentile were computed from this data. The results of the computations are shown in Table XIV.

TABLE XIV

MEDIAN, TWENTY-FIFTH PERCENTILE AND SEVENTY-FIFTH PERCENTILE FOR QUALITY OF LONGHAND PENMANSHIP OF SIX-HUNDRED SEVENTY-SIX STUDENTS STUDYING SHORTHAND IN THIRTY HIGH SCHOOLS OF KANSAS, COMPUTED FROM MEANS OF TESTS 1, 2, AND 3

Participants	Cases	Median	Twenty-Fifth Percentile	Seventy-Fifth Percentile
All Students	676	51.94	41.99	66.43
Girls	662	52.17	42.57	66.70
Righthanded	628	52.30	42.61	66.67
Lefthanded	48	46.67	37.31	55.67
Boys	14	39.00	31.25	47.50

It is significant to note that in all instances, the quality of writing longhand decreased after studying shorthand. This fact may be seen clearly by comparing the quartile scores of the various classifications of students in Tables XI, XII, and XIII.

Comparison of the Speed of Writing Longhand Before Studying Shorthand and After Studying Shorthand. The quartile scores of the speed of writing longhand are given in Table XV. This data would indicate that the writing of shorthand will cause an increase in the student's speed of writing longhand. A gain of approximately six words for a period of 2 minutes, or 3 words per minute is evident from the data given below.

TABLE XV

MEDIAN, TWENTY-FIFTH PERCENTILE AND SEVENTY-FIFTH PERCENTILE FOR SPEED OF LONGHAND PENMANSHIP OF SIX-HUNDRED SEVENTY-SIX SHORTHAND STUDENTS IN THIRTY HIGH SCHOOLS OF KANSAS

Test Number	Median	Twenty-Fifth Percentile	Seventy-Fifth Percentile
1	45.03	37.65	53.28
2	47.87	41.66	55.50
3	51.48	44.21	59.08

The median, twenty-fifth percentile and seventy-fifth percentile for girls, boys, righthanded students and lefthanded students, resulting from the three longhand tests, are expressed in Tables XVI, XVII, and XVIII. Although some

TABLE XVI

MEDIAN, TWENTY-FIFTH PERCENTILE AND SEVENTY-FIFTH PERCENTILE FOR SPEED OF LONGHAND PENMANSHIP OF STUDENTS STUDYING SHORTHAND IN THIRTY HIGH SCHOOLS OF KANSAS, TEST NUMBER 1

Participants	Cases	Median	Twenty-Fifth Percentile	Seventy-Fifth Percentile
All Students	676	45.03	37.65	53.28
Girls	662	45.09	37.56	53.39
Righthanded	628	45.08	37.80	53.20
Lefthanded	48	44.25	35.50	54.00
Boys	14	43.84	40.92	49.25

TABLE XVII

MEDIAN, TWENTY-FIFTH PERCENTILE AND SEVENTY-FIFTH PERCENTILE FOR SPEED OF LONGHAND PENMANSHIP OF STUDENTS STUDYING SHORTHAND IN THIRTY HIGH SCHOOLS OF KANSAS, TEST NUMBER 2

Participants	Cases	Median	Twenty-Fifth Percentile	Seventy-Fifth Percentile
All Students	676	47.87	41.66	55.50
Girls	662	47.87	41.63	55.54
Righthanded	628	47.93	41.82	55.59
Lefthanded	48	46.93	39.25	54.88
Boys	14	48.00	33.00	54.25

TABLE XVIII

MEDIAN, TWENTY-FIFTH PERCENTILE AND SEVENTY-FIFTH PERCENTILE FOR SPEED OF LONGHAND PENMANSHIP OF STUDENTS STUDYING SHORTHAND IN THIRTY HIGH SCHOOLS OF KANSAS, TEST NUMBER 3

Participants	Cases	Median	Twenty-Fifth Percentile	Seventy-Fifth Percentile
All Students	676	51.48	44.21	59.08
Girls	662	51.33	44.29	59.14
Righthanded	628	51.39	44.29	58.99
Lefthanded	48	52.72	43.00	59.88
Boys	14	45.50	42.58	56.75

variance is found in the quartile scores when the three tables are compared, the increase or decrease is not consistant throughout any one classification.

The arithmetic mean of the scores of speed on tests 1, 2, and 3 was computed. The median, twenty-fifth percentile and seventy-fifth percentile were obtained from this data. The results of the computations are shown below in Table XIX.

TABLE XIX

MEDIAN, TWENTY-FIFTH PERCENTILE AND SEVENTY-FIFTH PERCENTILE FOR SPEED OF LONGHAND PENMANSHIP OF STUDENTS STUDYING SHORTHAND IN THIRTY HIGH SCHOOLS OF KANSAS, COMPUTED FROM MEANS OF TESTS 1, 2, AND 3

Participants	Cases	Median	Twenty-Fifth Percentile	Seventy-Fifth Percentile
All Students	676	48.35	42.01	55.33
Girls	662	48.39	42.08	55.35
Righthanded	628	48.30	42.17	55.10
Lefthanded	48	47.50	41.50	53.07
Boys	14	47.50	43.63	53.00

In all instances, the speed of writing longhand increased after studying shorthand.

Comparison of the Causes for Withdrawals From Shorthand. After comparing the participants of the first and second longhand tests, it was found that 151 students who took the first of the series of tests did not take the second. These students represented twenty-seven of the thirty high schools cooperating in this investigation. A form was sent to each school at the end of the year, asking the teacher to check, in one of several columns provided, the reason why some of her students did not participate in the second longhand test. The tabulation of the various columns of the check sheets show that of the 92 students who did not take the second test, because of reasons other than absence from school, 57.61% were no longer enrolled in shorthand because of the difficulty of the subject. Table XX shows a summarization of the causes for the smaller number enrolled in shorthand at the end of the school year as compared with the first of the year.

TABLE XX

CAUSES FOR STUDENTS WITHDRAWING FROM SHORTHAND IN THIRTY HIGH SCHOOLS OF KANSAS, 1949-1950

School	Absent the Day Test Was Given	No Longer Enrolled in Shorthand		Left School	
		Subject too Difficult	Change of Curriculum	Enrolled in Another School	Left School Entirely
1	1	3			
2	1	—	—	—	—
Forwarded	2	3	0	0	0

School Day	Absent the Test Was Given	No Longer Enrolled in Shorthand		Left School	
		Subject too Difficult	Change of Curriculum	Enrolled in Another School	Left School Entirely
Forwarded	2	3	0	0	0
3		2			
4	4	10			
5		1			
6	1				
7	8		1		3
8	4	3		1	2
9				1	1
10	1				2
11					1
12	1			1	
13	3	2	2	2	3
14	1				
15	2	3		2	1
16	3	6	1		3
17		3			1
18	1			1	
19		3			
20		3		1	
21			1		
22	2	3	-	1	-
Forwarded	33	42	5	10	17

School Day	Absent the Test Was Given	No Longer Enrolled in Shorthand		Left School	
		Subject too Difficult	Change of Curriculum	Enrolled in Another School	Left School Entirely
Forwarded	33	42	5	10	17
23	1			2	
24	3	9		17	
25	3	1		5	
26					1
27	—	1	—	—	—
Totals	40	53	5	34	18

CHAPTER III

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

As originally stated, this study proposed to try to determine whether certain predictions of success in shorthand could be determined by a study of one's quality and speed in longhand writing. It also attempted to determine the possible variance of longhand and shorthand proficiency between girls and boys, and between lefthanded students and righthanded students.

Specimens of longhand and Gregg shorthand writing were obtained from 676 Shorthand I students, who represented thirty high schools in the state of Kansas. The pupils consisted of 662 girls and 14 boys, 628 righthanded students and 48 lefthanded students. Three longhand specimens were secured from each pupil, one at the first of the year, one at the beginning of the second semester, and one at the conclusion of the school year. One specimen of shorthand writing was obtained at the end of the year. A check sheet, instructing the shorthand teacher to indicate the cause of her withdrawals from shorthand, was enclosed with the shorthand test.

The material for the longhand specimen was chosen from literature, the first four sentences from Lincoln's

Gettysburg Address. Material for the shorthand specimen consisted of the entire Address.

The rating scale selected for classifying longhand samples was the Ayres Handwriting Scale by Leonard P. Ayres, while the shorthand specimens were rated by Hoke's Shorthand Penmanship Scale for Gregg Shorthand.

A total of 2,028 specimens of longhand writing and 676 of shorthand writing were obtained. The results of this study were to be determined by correlating scores of longhand and shorthand, and by calculating quartile rankings on the different tests. Coefficients of correlation were worked out according to Pearson's Product-Moment method and according to the rank correlation method.

Of the correlations obtained, the highest were those found between the speed of writing shorthand and longhand (.6372 $\pm$ .0154) and between the quality of shorthand and longhand writing (.6808 $\pm$ .0139). It appears, from these correlations, that the writer who is proficient in both speed and quality of longhand penmanship would be expected to write shorthand with a comparable degree of success.

The lowest correlations were found between speed and quality of longhand writing (.0556 $\pm$ .0258) and between speed and quality of shorthand writing (.2047 $\pm$ .0249). On the basis of these correlations, there is apparently very little, if any, relationship between the ability to write rapidly and the ability to write with a high degree of quality.

Upon comparing the speed of writing shorthand for the classifications of students, it was found that boys write approximately five words less per minute than girls and that lefthanded students write approximately 2 words less per minute than righthanded students. There was very little variance among the groups insofar as speed of longhand was concerned. From the quartiles established, it appears that boys write a lower quality of shorthand than girls and that lefthanded students write poorer shorthand than righthanded students. The data also disclose that boys write a lower quality of longhand than girls and that lefthanded students write poorer longhand than righthanded students.

The quartile rankings for longhand tests 1, 2, and 3 were compared. It is apparent, from this data, that the quality of longhand penmanship decreased slightly after studying shorthand. Test Number 1 shows a median score of 54.42; the median for test Number 3 is 52.97. During the same period of time, the median speed of writing longhand had increased considerably (45.03 wpm. to 51.48 wpm.). These facts would lead one to believe that writing shorthand is, to a degree, injurious to the quality of longhand penmanship. Writing shorthand does, however, seem to affect an increase in the speed of writing longhand.

The tabulation of the causes for withdrawals during the first semester of shorthand indicate that 57.61% were no longer enrolled in shorthand because of the difficulty of the

subject. This fact lends itself to the growing sentiment of business educators for the need of further research in prognostic testing and better selective devices in the field of shorthand.

Conclusions

The need for predicting success in shorthand has received considerable interest by business educators. Although this investigation has not attempted to construct a prognostic test, it did attempt to procure the possible relationship between longhand penmanship and shorthand writing.

The conclusions derived as a result of this investigation are:

(1) A high correlation was found between the rapidity of writing longhand and the rapidity of writing shorthand. This would lead one to believe that the person who writes longhand at a rapid rate of speed will write shorthand at a correspondingly rapid rate; the slow writer of longhand will also write comparatively slow shorthand.

(2) The quality of longhand writing correlated highly with the quality of shorthand writing. This seems to indicate that the expert longhand writer will achieve a comparable degree of success in the writing of shorthand. Moreover, the poor writer of longhand will become a poor writer of shorthand.

(3) The data seem to indicate that there is very little, if any, relationship between speed and quality of shorthand penmanship. Therefore, the ability to write rapid shorthand is not dependant upon the quality of shorthand penmanship.

(4) The correlation obtained between quality and rapidity of writing longhand is near zero. It is apparent, therefore, that the expert longhand writer is not necessarily a rapid writer.

(5) Lefthanded students write slower and less legible shorthand than righthanded students. Although the variance is small, the writer believes that its existence is significant.

(6) The data show that lefthanded students write slower and less legible longhand than righthanded students.

(7) Upon comparing the speed and quality of longhand writing for boys and girls, it is apparent that boys write slower and less legible longhand than girls.

(8) The speed and quality of shorthand writing for boys was compared with the same criteria for girls. It was found that the degree of quality and speed of shorthand writing for boys is slightly below that of girls.

(9) The quality of longhand writing deteriorates after studying shorthand, compared with the quality at the beginning of the school year. The writing of shorthand has affected an increase in the student's speed of writing longhand during the same period of time.

(10) Approximately one-half (57.61%) of the students who withdrew from shorthand between the first and second semester of the school year, did so because of the difficulty of the subject.

Although a substantial correlation was found between the speed and quality of longhand and shorthand writing, the writer believes that this data is not sufficient to warrant individual predictions of shorthand success. Factors other than ability in longhand penmanship must be considered, possibly such factors as interest, effort, intelligence, physical factors, and English marks.

Recommendations

It is recommended that the tests used in this study be given to a larger number of students, thereby procuring greater objectivity to the data. Because several of the conclusions derived in this study are significant, it is recommended that a test of longhand penmanship be given consideration for being included as a part of a battery of tests used to predict possible success in shorthand. It is further recommended that other investigations be made in the field of prognostication, in order to derive a selective process for obtaining students who have potential abilities for becoming shorthand writers.

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APPENDIX

TEST SCORES OF SIX-HUNDRED SEVENTY-SIX SHORTHAND STUDENTS IN THIRTY HIGH SCHOOLS OF KANSAS

Student	Quality of Writing					Speed of Writing				
	Longhand Tests				Shorthand	Longhand Tests				Shorthand
	1	2	3	Ave.	Test	1	2	3	Ave.	Test
1	70	70	70	70.00	80	49	40	52	47.00	90
2	70	70	70	70.00	80	55	53	60	56.00	61
3	40	40	40	40.00	30	43	45	48	45.33	97
4	50	50	40	46.67	30	46	50	57	51.00	105
5	50	50	40	46.67	40	58	56	48	54.00	85
6	70	70	70	70.00	70	32	39	49	40.00	102
7	60	70	70	66.67	50	39	30	46	38.33	71
8	60	60	60	60.00	60	45	39	41	42.67	76
9	70	70	70	70.00	80	40	45	39	41.33	73
10	40	40	40	40.00	70	41	35	38	38.00	79
11	90	90	90	90.00	80	52	53	51	52.00	70
12	50	60	60	56.67	70	38	43	46	42.33	82
13	70	60	60	63.33	50	33	31	30	31.00	68
14	60	60	60	60.00	30	40	47	42	43.00	94
15	60	60	60	60.00	40	48	53	52	51.00	107
16	80	80	80	80.00	80	38	49	55	47.33	125
17	70	70	70	70.00	70	32	38	39	36.33	96
18	50	50	50	50.00	50	49	43	41	44.33	88
19	60	60	60	60.00	60	45	47	50	47.33	91
20	60	50	50	53.33	50	41	43	41	41.67	95

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
21	50	50	40	46.67	50	41	43	41	41.67	95
22	70	70	70	70.00	60	32	42	39	37.67	75
23	70	70	70	70.00	60	38	43	43	41.33	93
24	80	80	80	80.00	50	35	41	45	40.33	101
25	60	60	60	60.00	70	45	42	46	44.33	97
26	70	80	80	76.33	40	35	42	37	38.33	96
27	60	70	60	63.33	60	54	58	59	57.00	139
28	90	90	90	90.00	80	46	60	63	56.33	134
29	50	50	40	46.67	40	61	83	78	74.00	190
30	70	70	70	70.00	70	42	45	42	43.00	102
31	80	70	70	73.33	80	49	66	69	61.33	175
32	70	70	70	70.00	70	51	49	46	48.67	141
33	40	40	30	36.67	40	41	51	51	47.67	171
34	80	80	80	80.00	80	51	48	53	50.67	114
35	40	30	30	36.67	30	52	48	58	52.67	162
36	50	50	50	50.00	50	59	64	67	63.33	196
37	80	70	70	73.33	30	43	49	51	47.67	148
38	40	50	40	43.67	50	61	60	70	63.67	196
39	40	30	30	33.33	80	43	42	44	43.00	119
40	80	80	80	80.00	80	46	54	51	50.33	138
41	50	50	50	50.00	60	36	52	51	46.33	124
42	60	50	40	50.00	40	49	48	46	47.67	119
43	30	30	30	30.00	20	34	38	40	37.33	76
44	50	60	50	53.67	60	49	34	46	42.67	112
45	40	40	30	36.67	40	53	63	61	59.00	115

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
46	70	70	70	70.00	80	53	52	61	55.67	147
47	40	40	40	40.00	60	45	41	46	44.00	115
48	70	70	60	66.67	70	43	51	45	46.33	112
49	50	40	40	46.67	50	48	45	53	48.67	79
50	40	40	30	36.67	30	51	45	62	52.67	97
51	50	50	50	50.00	70	51	54	52	52.33	137
52	40	40	40	40.00	50	60	54	59	57.67	123
53	70	70	70	70.00	60	45	43	52	46.67	97
54	40	40	40	40.00	40	53	43	46	47.33	94
55	50	60	50	53.33	60	45	45	45	45.00	119
56	50	50	50	50.00	50	51	49	54	51.33	95
57	50	50	50	50.00	50	36	43	52	43.67	98
58	50	40	50	46.67	47	54	53	45	50.67	106
59	40	40	40	40.00	30	61	54	45	56.33	86
60	50	40	40	43.33	50	45	56	63	51.33	104
61	60	50	60	56.67	60	47	46	53	48.67	133
62	50	50	50	50.00	60	45	58	46	49.67	75
63	50	50	50	50.00	60	51	51	46	48.33	86
64	50	50	50	50.00	30	45	48	54	45.67	108
65	70	70	60	66.67	70	74	48	52	58.00	133
66	50	50	50	50.00	80	43	35	40	39.33	97
67	50	40	40	43.33	30	57	66	62	61.67	131
68	50	50	50	50.00	50	36	43	36	38.33	94
69	70	70	70	70.00	70	51	41	43	45.00	86
70	50	50	50	50.00	50	42	33	50	41.67	107

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
71	50	50	40	43.33	70	51	52	55	52.67	69
72	80	80	80	80.00	80	67	52	52	57.00	79
73	70	80	80	76.67	90	51	49	56	52.00	56
74	50	50	50	50.00	40	45	46	48	46.33	98
75	80	80	70	76.67	90	45	35	43	41.00	87
76	60	50	50	53.33	50	38	41	46	41.67	98
77	70	70	70	70.00	70	34	40	45	39.67	115
78	80	80	70	76.67	70	62	61	66	63.00	97
79	80	70	70	73.33	70	61	48	50	53.00	85
80	50	60	50	53.33	50	59	40	49	49.44	110
81	80	70	70	73.33	80	39	40	39	39.33	71
82	30	30	30	30.00	30	52	51	50	51.00	90
83	60	50	50	53.33	60	86	52	55	64.33	141
84	80	80	80	80.00	60	52	52	60	54.67	118
85	90	80	80	83.33	60	85	41	54	60.00	91
86	50	60	60	56.67	50	64	58	68	63.33	153
87	50	60	50	53.33	50	80	49	59	62.67	88
88	60	60	60	60.00	40	53	39	48	46.67	78
89	70	70	70	70.00	80	60	55	45	53.33	145
90	50	50	50	50.00	50	58	37	41	45.33	77
91	50	50	50	50.00	30	53	51	59	54.33	83
92	60	60	60	60.00	60	75	47	49	57.00	97
93	50	50	50	50.00	50	61	45	61	55.67	114
94	60	60	60	60.00	60	63	52	72	62.33	134
95	80	80	80	80.00	80	58	43	65	55.33	78

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
96	60	70	60	63.33	70	83	51	56	63.33	88
97	50	50	40	46.67	70	62	58	69	63.00	136
98	70	70	60	66.67	70	82	47	70	66.33	118
99	50	70	60	60.00	40	54	61	58	57.67	106
100	80	60	80	73.33	80	58	50	54	54.00	85
101	70	80	70	73.33	60	49	47	43	46.33	61
102	80	80	80	80.00	70	64	56	41	53.67	85
103	50	50	50	50.00	30	66	49	61	58.67	124
104	50	50	40	46.67	60	78	66	79	74.33	86
105	50	50	50	50.00	60	52	68	54	58.00	133
106	70	60	50	60.00	30	99	43	43	81.67	115
107	70	70	70	70.00	70	99	52	52	67.67	123
108	30	40	40	36.67	20	51	63	58	57.33	155
109	90	90	80	86.67	90	99	42	56	65.67	98
110	60	60	60	60.00	50	49	66	51	55.33	119
111	60	50	50	53.33	60	99	40	42	60.33	83
112	50	40	30	40.00	40	45	61	54	53.33	146
113	60	70	70	66.67	70	49	63	45	52.33	151
114	70	70	70	70.00	60	99	39	43	60.33	77
115	50	40	40	43.33	50	99	49	43	68.00	111
116	90	90	90	90.00	80	99	42	49	63.33	89
117	50	60	50	53.33	60	99	47	50	65.33	130
118	70	50	50	56.67	40	52	63	59	52.67	143
119	60	60	60	60.00	60	43	59	45	50.33	130
120	50	60	60	56.67	60	99	39	43	67.00	125

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
121	40	40	40	40.00	40	99	51	51	67.00	90
122	30	30	30	30.00	40	46	60	58	54.67	128
123	70	80	80	76.67	80	50	54	50	48.00	114
124	50	60	50	53.33	40	58	61	61	60.00	134
125	70	80	70	73.33	90	40	54	42	45.33	118
126	40	40	40	40.00	30	35	42	43	40.00	122
127	80	80	80	80.00	70	52	52	54	52.67	147
128	70	70	70	70.00	60	39	43	54	45.33	133
129	70	60	60	63.33	60	36	44	52	44.00	141
130	60	50	50	53.33	60	32	35	45	37.33	139
131	40	40	40	40.00	70	31	42	54	42.33	125
132	70	60	60	63.33	60	48	49	58	51.67	116
133	50	50	50	50.00	50	35	43	43	42.00	147
134	70	80	80	76.67	80	39	43	46	42.00	131
135	80	80	80	80.00	80	38	42	46	42.00	130
136	50	40	50	46.67	40	35	35	43	37.67	111
137	50	40	30	40.00	90	39	43	38	40.00	112
138	60	40	40	46.67	60	39	42	55	45.33	159
139	80	70	70	73.33	50	47	51	58	52.00	146
140	70	60	60	63.33	60	47	48	50	48.33	127
141	50	50	50	50.00	70	35	36	39	36.67	135
142	60	60	60	60.00	60	49	46	52	52.33	125
143	70	70	70	70.00	80	41	43	46	43.67	122
144	50	50	50	50.00	60	36	40	45	40.33	134
145	50	50	50	50.00	70	40	38	39	39.00	115

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
146	50	40	40	43.67	60	56	52	52	53.33	128
147	40	40	40	40.00	30	29	42	38	36.00	90
148	60	60	60	60.00	60	30	27	33	29.67	90
149	40	40	40	40.00	30	32	38	39	36.33	126
150	80	80	80	80.00	70	40	39	43	40.67	123
151	30	30	30	30.00	30	71	75	66	70.67	131
152	40	30	30	33.33	40	35	33	56	41.33	147
153	80	70	80	76.67	80	39	41	49	43.00	123
154	60	60	60	60.00	60	40	39	48	42.33	129
155	50	60	60	56.67	30	49	49	58	52.00	94
156	50	50	50	50.00	50	42	48	50	46.67	134
157	50	50	50	50.00	60	49	43	46	46.00	102
158	90	80	80	83.33	90	35	41	43	39.67	77
159	50	50	50	50.00	50	43	41	46	43.67	86
160	60	50	50	53.33	60	45	48	49	47.33	103
161	50	60	50	53.33	50	41	42	50	44.33	119
162	80	80	80	80.00	40	49	49	50	49.33	63
163	70	70	70	70.00	60	35	35	40	40.00	90
164	50	50	50	50.00	50	48	48	58	51.33	159
165	70	70	70	70.00	70	32	44	58	44.67	138
166	50	50	50	50.00	70	43	44	45	44.00	115
167	50	50	50	50.00	60	43	43	45	43.67	129
168	50	60	60	56.67	70	49	61	59	56.33	127
169	70	70	70	70.00	50	49	55	61	55.00	167
170	50	50	40	46.67	30	43	53	60	52.00	138

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
171	40	40	40	40.00	30	64	67	68	66.33	202
172	50	40	40	43.33	70	73	82	81	78.67	190
173	40	40	40	40.00	40	26	27	26	26.33	114
174	50	40	40	43.33	60	61	67	70	66.00	206
175	50	50	50	50.00	60	41	39	43	41.00	114
176	50	50	50	50.00	70	43	45	58	48.67	110
177	40	40	30	36.67	30	52	37	61	50.00	180
178	60	60	60	60.00	70	43	51	59	51.00	124
179	40	40	40	40.00	60	55	65	50	56.67	103
180	50	40	40	43.33	60	58	76	70	68.00	146
181	50	50	40	46.67	30	69	64	84	72.33	193
182	50	50	50	50.00	80	45	59	59	54.33	141
183	40	30	30	33.33	30	43	50	59	50.67	141
184	50	50	50	50.00	60	64	71	70	68.33	158
185	50	40	40	43.33	20	74	72	72	72.67	153
186	50	50	50	50.00	40	64	58	64	62.00	140
187	40	40	40	40.00	40	35	48	43	42.00	96
188	40	50	50	46.67	90	45	53	52	50.00	175
189	60	50	50	53.33	50	55	56	68	59.67	187
190	50	40	40	43.33	60	63	68	68	66.33	188
191	30	40	40	36.67	30	22	52	58	44.00	114
192	90	90	90	90.00	70	41	51	45	45.67	107
193	40	40	30	36.67	30	58	65	63	62.00	188
194	50	40	40	43.33	40	46	51	58	51.67	130
195	80	80	80	80.00	90	65	69	53	62.33	139

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
196	80	80	80	80.00	80	49	50	53	50.67	102
197	50	50	40	46.67	40	52	53	63	56.00	193
198	50	50	50	50.00	40	54	48	58	53.33	160
199	50	50	50	50.00	60	53	58	58	56.33	126
200	50	50	50	50.00	80	58	58	46	54.00	137
201	50	50	50	50.00	30	42	59	53	51.33	139
202	50	50	50	50.00	70	51	52	61	54.67	166
203	50	40	40	43.33	60	54	57	65	58.67	146
204	50	50	40	46.67	30	62	60	77	66.33	171
205	40	40	30	36.67	30	52	53	52	52.33	124
206	70	70	70	70.00	70	35	42	42	37.67	86
207	70	70	70	70.00	60	41	54	54	47.00	131
208	60	50	50	56.67	60	37	43	43	40.33	97
209	60	70	70	66.67	70	42	44	44	43.67	137
210	50	50	50	50.00	50	39	44	44	39.67	110
211	60	70	70	66.67	80	35	51	51	43.33	102
212	50	50	50	50.00	56	35	43	43	39.00	105
213	80	80	80	80.00	90	41	43	43	41.33	107
214	60	60	70	66.67	70	40	49	47	44.33	91
215	40	40	50	43.33	40	43	45	54	46.67	120
216	60	60	50	53.33	60	38	46	43	43.00	126
217	50	60	50	53.33	60	35	38	36	34.00	91
218	50	50	50	50.00	50	39	46	42	41.67	124
219	50	50	50	50.00	60	40	54	46	48.67	124
220	60	60	50	56.67	50	35	39	38	37.00	107

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
221	80	80	70	73.33	80	48	51	57	53.33	104
222	70	60	80	60.00	70	35	41	40	37.00	83
223	60	60	60	60.00	80	28	41	42	36.33	97
224	70	70	60	66.67	70	45	50	62	46.00	139
225	90	90	80	83.33	80	37	40	39	36.00	121
226	60	40	40	63.33	40	35	40	45	41.67	78
227	90	90	90	90.00	80	49	49	47	47.67	118
228	80	80	80	80.00	90	36	42	46	42.67	95
229	50	40	40	43.33	30	56	62	69	62.33	133
230	50	50	50	50.00	50	33	43	49	41.67	61
231	60	50	50	53.33	50	39	50	37	42.00	122
232	50	50	50	50.00	60	47	43	46	45.33	141
233	30	30	30	30.00	30	64	68	75	69.00	144
234	60	50	50	53.33	50	49	56	58	54.33	123
235	70	80	80	76.67	80	54	61	64	59.67	139
236	30	20	20	23.33	30	58	59	63	60.00	134
237	50	40	40	46.67	50	64	64	68	65.33	142
238	40	40	40	40.00	40	59	60	63	60.67	141
239	50	50	50	50.00	50	48	66	61	58.33	130
240	70	70	70	70.00	80	45	43	42	43.67	89
241	50	50	50	50.00	80	59	58	52	56.33	177
242	40	30	30	33.33	30	52	45	61	52.67	146
243	50	40	40	43.33	40	59	71	73	67.67	193
244	50	50	50	50.00	90	49	58	54	53.67	171
245	50	40	40	43.33	50	50	56	61	55.67	193

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
246	50	50	50	50.00	50	41	47	43	43.67	88
247	50	50	50	50.00	20	50	61	61	57.33	188
248	50	60	60	56.67	60	60	46	54	53.33	148
249	40	40	30	36.67	40	49	48	54	50.33	121
250	50	40	40	43.33	40	52	63	67	60.67	182
251	40	30	30	33.33	50	35	28	37	33.33	97
252	50	50	50	50.00	50	52	48	57	52.33	163
253	40	30	30	33.33	40	49	58	52	53.00	125
254	90	90	90	90.00	90	43	47	56	48.67	110
255	50	60	60	56.67	50	55	44	51	50.00	85
256	50	50	50	50.00	60	41	43	54	46.00	106
257	50	60	60	56.67	60	50	46	52	49.33	97
258	50	50	50	50.00	50	46	44	52	47.33	96
259	70	70	70	70.00	40	42	36	44	40.67	110
260	50	50	50	50.00	30	51	53	57	53.67	94
261	50	50	50	50.00	40	52	53	56	53.67	103
262	50	50	50	50.00	60	53	52	54	53.00	95
263	80	80	80	80.00	80	58	43	46	49.00	102
264	30	30	20	36.67	30	45	43	44	44.00	82
265	70	70	70	70.00	70	47	36	47	43.67	83
266	50	50	50	50.00	60	40	41	47	42.67	110
267	60	50	50	53.33	50	25	28	27	26.67	81
268	60	60	50	53.33	50	25	22	40	29.00	78
269	50	50	50	50.00	70	37	41	42	40.00	69
270	70	60	60	63.33	60	37	43	53	44.33	114

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
271	90	90	90	90.00	90	18	32	31	27.00	85
272	50	60	60	56.67	70	30	46	46	40.67	105
273	80	80	80	80.00	30	38	38	35	37.00	114
274	60	60	60	60.00	50	45	43	44	44.00	73
275	50	50	40	46.67	40	25	36	44	35.00	115
276	50	50	50	50.00	50	41	37	42	40.00	94
277	90	90	90	90.00	80	35	40	38	37.67	88
278	80	80	80	80.00	40	20	30	36	28.67	82
279	50	50	50	50.00	50	31	37	32	33.33	114
280	50	60	60	56.67	60	27	42	43	37.33	97
281	70	70	70	70.00	70	33	46	49	42.67	131
282	50	50	50	50.00	50	22	31	35	29.33	68
283	70	70	70	70.00	80	33	36	41	36.67	60
284	70	70	70	70.00	90	22	39	36	32.33	96
285	50	50	50	50.00	40	32	52	59	47.67	103
286	40	30	30	33.33	30	28	23	49	33.33	114
287	60	60	50	56.67	60	43	43	31	39.00	120
288	50	60	60	56.67	50	22	25	39	28.67	60
289	70	70	70	70.00	80	38	41	44	41.00	92
290	90	80	80	83.33	90	34	36	46	38.67	110
291	50	50	40	46.67	60	27	33	44	34.67	97
292	50	40	40	43.33	40	31	37	39	35.67	90
292	90	90	90	90.00	80	25	22	31	26.00	59
294	50	50	50	50.00	40	28	27	28	27.67	74
295	90	90	90	90.00	90	65	72	71	69.33	202

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
296	50	50	50	50.00	50	49	48	57	51.33	104
297	40	40	50	43.33	50	55	68	80	67.67	187
298	50	50	50	50.00	50	62	61	66	63.00	171
299	70	60	60	63.33	60	56	66	70	64.00	167
300	50	40	40	43.33	40	50	63	61	58.00	146
301	30	30	30	30.00	60	40	66	44	50.00	132
302	60	60	60	60.00	60	57	55	75	62.33	144
303	60	50	50	53.33	40	62	70	86	72.67	184
304	40	40	40	40.00	40	58	56	70	61.33	176
305	50	60	60	56.67	60	40	49	54	47.67	107
306	40	40	40	40.00	20	62	66	74	67.33	174
307	50	40	40	43.33	40	72	80	94	82.00	220
308	60	40	40	50.00	60	35	66	53	51.33	102
309	40	40	40	40.00	40	42	49	54	48.33	97
310	80	70	70	73.33	70	46	49	56	50.33	149
311	60	60	60	60.00	70	53	63	70	62.00	123
312	40	40	40	40.00	40	49	48	57	51.33	146
313	50	50	50	50.00	50	43	49	49	47.00	102
314	60	60	60	60.00	90	40	51	58	49.67	135
315	40	40	40	40.00	30	56	60	65	60.33	150
316	50	40	40	43.33	40	37	45	53	45.00	120
317	70	70	70	70.00	40	47	42	44	44.33	175
318	30	30	20	36.67	40	63	49	61	57.67	90
319	50	50	50	50.00	50	27	33	39	33.00	79
320	80	80	80	80.00	80	38	40	45	41.00	121

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
321	70	70	70	70.00	80	51	48	50	49.67	115
322	40	40	40	40.00	80	49	48	51	49.33	123
323	60	60	50	56.67	50	43	49	53	48.33	114
324	60	50	50	53.33	60	42	50	54	48.67	128
325	50	40	40	43.33	60	40	40	40	40.00	78
326	80	80	80	80.00	80	43	45	52	46.67	121
327	30	30	20	26.67	70	45	43	61	49.67	184
328	50	50	50	50.00	50	49	45	52	48.67	133
329	50	40	40	43.33	40	51	49	61	53.67	120
330	40	50	50	46.67	60	45	47	46	46.00	90
331	90	80	80	83.33	80	43	39	52	44.67	114
332	60	50	50	53.33	60	35	60	36	40.67	107
333	50	40	50	46.67	50	40	40	46	42.00	114
334	30	30	30	30.00	20	52	50	51	51.00	122
335	50	50	50	50.00	60	42	38	43	41.00	78
336	30	30	30	30.00	50	47	40	39	42.00	114
337	80	80	80	80.00	90	76	73	74	75.00	151
338	30	40	30	33.33	60	56	52	59	55.67	129
339	50	50	50	50.00	60	55	56	58	56.33	169
340	40	30	30	33.33	30	45	39	61	48.33	111
341	80	90	90	86.67	90	35	45	52	44.00	115
342	80	80	80	80.00	70	29	49	54	44.00	114
343	40	30	30	33.33	50	43	35	63	53.67	118
344	70	70	70	70.00	90	51	59	61	57.00	171
345	40	40	30	36.67	30	51	68	65	61.33	146

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
346	90	90	90	90.00	80	26	31	40	32.33	90
347	50	50	40	46.67	50	51	51	70	57.33	149
348	40	50	50	46.67	50	47	45	51	47.67	127
349	50	40	40	43.44	50	37	49	63	49.67	142
350	80	80	80	80.00	80	43	39	49	43.67	144
351	40	30	30	33.33	30	45	42	43	43.67	78
352	80	80	80	80.00	50	40	45	53	46.00	105
353	80	70	70	73.33	40	30	45	46	40.33	92
354	70	70	70	70.00	80	47	42	40	43.00	129
355	80	70	60	70.00	90	50	55	74	59.67	177
356	50	50	50	50.00	40	51	49	49	49.67	142
357	60	50	50	53.33	50	49	60	54	54.33	131
358	60	50	50	53.33	60	63	77	66	68.67	158
359	40	30	30	33.33	50	39	43	46	42.67	95
360	50	60	60	56.67	50	45	54	54	51.00	133
361	60	50	40	50.00	50	45	43	41	43.00	143
362	70	70	60	66.67	70	38	38	53	43.00	106
363	70	70	70	70.00	70	39	48	61	49.33	152
364	60	60	60	60.00	60	36	41	51	42.67	134
365	50	50	40	46.67	50	45	49	53	49.00	135
366	90	90	90	90.00	80	35	38	43	38.67	133
367	70	60	60	63.33	40	43	53	58	51.33	122
368	40	40	40	40.00	60	35	57	36	42.67	77
369	30	30	30	30.00	30	32	37	35	34.67	97
370	80	80	80	80.00	80	37	45	54	45.33	142

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
371	20	20	20	20.00	20	65	55	65	61.67	127
372	60	70	70	66.67	50	37	45	63	44.67	140
373	80	80	80	80.00	80	52	49	52	51.00	111
374	50	50	40	46.67	50	41	46	49	45.33	118
375	50	40	40	43.33	30	32	41	43	38.67	74
376	50	40	40	43.33	20	37	36	38	37.00	93
377	50	40	40	43.33	50	35	41	51	42.33	87
378	40	40	40	40.00	50	43	35	41	39.67	105
379	60	60	60	60.00	60	45	58	56	53.00	122
380	70	70	70	70.00	40	40	39	46	41.67	85
381	60	60	60	60.00	60	31	31	37	33.00	76
382	60	60	60	60.00	30	40	40	45	41.67	96
383	50	50	50	50.00	50	47	58	60	55.00	97
384	60	60	60	60.00	70	41	52	48	47.00	114
385	60	60	60	60.00	80	47	47	49	47.67	130
386	50	40	40	43.33	30	51	53	58	54.00	130
387	70	70	70	70.00	70	49	50	60	53.00	138
388	50	50	60	53.33	50	34	33	39	35.33	56
389	60	60	50	56.67	60	37	45	51	44.33	158
390	80	70	70	73.33	70	39	43	49	43.67	119
391	60	50	50	53.33	80	32	35	42	36.33	98
392	70	80	70	73.33	50	52	60	80	64.00	158
393	80	80	80	80.00	80	37	48	46	43.67	124
394	70	70	70	70.00	80	41	41	54	45.33	114
395	30	30	30	30.00	30	35	61	54	50.00	130

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
396	50	50	50	50.00	70	30	47	52	43.00	120
397	50	60	60	56.67	70	40	36	46	40.67	115
398	60	60	60	60.00	70	30	41	41	37.33	121
399	80	80	80	80.00	70	52	55	62	56.33	186
400	60	70	60	63.33	60	45	53	65	54.33	187
401	70	70	70	70.00	70	49	43	49	47.00	182
402	50	50	50	50.00	40	43	35	43	40.33	144
403	60	50	50	53.33	60	36	45	50	43.67	91
404	50	50	50	50.00	50	33	38	39	36.67	110
405	70	70	70	70.00	70	67	74	79	73.33	175
406	60	70	70	66.67	70	49	61	61	57.00	175
407	50	40	40	43.33	40	54	62	57	57.67	146
408	60	60	60	60.00	60	46	52	61	53.00	127
409	30	20	20	26.67	80	63	82	66	57.00	197
410	50	50	50	50.00	60	47	53	63	54.33	124
411	30	40	40	33.33	40	49	49	54	50.67	88
412	20	20	20	20.00	20	54	45	56	51.67	114
413	50	40	40	43.33	50	37	47	56	46.67	140
414	40	30	30	33.33	30	61	85	81	69.00	193
415	40	40	40	40.00	40	51	48	56	51.67	124
416	60	70	70	66.67	30	55	61	61	59.00	131
417	50	50	50	50.00	50	49	45	61	51.67	122
418	40	40	40	40.00	40	17	34	36	29.00	82
419	50	40	40	43.33	40	32	31	36	33.00	54
420	50	50	50	50.00	50	30	38	45	37.67	130

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
421	50	40	40	43.33	70	37	30	36	34.33	87
422	50	50	40	46.67	60	17	31	25	24.33	74
423	80	80	80	80.00	50	39	47	46	44.00	84
424	70	70	70	70.00	60	35	35	34	34.67	78
425	50	50	50	50.00	50	43	53	56	50.67	110
426	50	60	60	56.67	60	31	49	45	41.67	83
427	80	80	80	80.00	60	33	44	43	40.00	129
428	50	50	50	50.00	60	36	38	39	37.67	62
429	90	90	80	86.67	90	37	44	35	38.67	93
430	40	40	40	40.00	40	45	51	45	47.00	83
431	50	40	30	40.00	50	37	43	43	41.00	132
432	60	60	60	60.00	60	35	35	41	37.00	64
433	50	40	40	43.33	60	43	41	46	43.67	61
434	50	40	40	43.33	50	52	46	49	49.00	128
435	40	40	40	40.00	40	43	52	59	51.33	98
436	50	60	50	53.33	40	22	27	31	26.67	65
437	50	50	50	50.00	50	34	54	49	45.67	47
438	60	60	60	60.00	50	45	49	53	49.00	106
439	70	70	70	70.00	40	41	58	51	50.00	146
440	50	50	40	46.67	50	30	52	43	38.33	133
441	50	50	50	50.00	60	48	56	52	52.00	169
442	70	80	80	76.67	50	24	51	43	39.33	126
443	50	50	50	50.00	30	46	55	51	50.67	146
444	50	50	50	50.00	70	49	56	42	49.00	114
445	70	80	80	76.67	30	36	43	42	40.33	142

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
446	50	50	50	50.00	40	51	39	39	43.00	91
447	40	40	40	40.00	60	35	53	49	45.67	138
448	60	70	70	66.67	70	35	46	42	41.00	89
449	50	70	70	63.33	60	36	54	51	47.00	153
450	60	60	50	56.67	50	45	61	49	51.67	97
451	40	40	40	40.00	30	28	38	36	34.00	128
452	50	50	50	50.00	60	50	58	61	56.33	160
453	50	50	40	46.67	40	39	45	41	41.67	110
454	70	70	70	70.00	70	29	49	17	41.33	111
455	60	60	60	60.00	50	43	49	45	45.67	85
456	60	60	60	60.00	70	45	48	53	48.67	128
457	70	70	70	70.00	50	37	42	49	42.67	75
458	50	50	50	50.00	50	35	51	41	42.33	97
459	30	30	40	33.33	30	43	46	54	47.67	146
460	40	40	40	40.00	40	55	54	55	54.67	127
461	80	80	80	80.00	80	24	37	35	32.00	125
462	50	50	40	46.67	80	45	54	43	47.33	144
463	70	60	60	63.33	30	66	42	45	51.00	52
464	40	40	40	40.00	50	39	41	35	38.33	73
465	90	80	80	83.33	80	38	46	45	43.00	128
466	50	50	50	50.00	70	35	45	43	41.00	132
467	60	60	60	60.00	50	32	46	40	49.33	141
468	50	50	50	50.00	70	30	42	41	37.67	125
469	70	70	70	70.00	60	45	43	46	44.67	128
470	50	40	30	40.00	30	38	52	46	45.33	73

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
471	50	50	50	50.00	40	35	52	41	42.67	118
472	60	60	60	60.00	30	45	38	39	40.67	85
473	80	80	80	80.00	80	39	35	37	35.33	77
474	50	50	50	50.00	40	50	52	49	50.33	68
475	50	50	50	50.00	50	45	45	41	43.67	182
476	60	70	70	66.67	70	48	51	45	48.00	110
477	70	70	70	70.00	80	52	51	51	51.33	85
478	50	50	50	50.00	40	58	46	54	52.67	73
479	50	40	40	43.33	40	50	51	51	50.67	129
480	40	40	40	40.00	40	51	39	43	44.33	68
481	50	40	30	40.00	50	54	43	49	48.67	91
482	50	50	50	50.00	50	49	56	57	54.00	121
483	40	30	30	33.33	40	53	52	57	54.00	148
484	80	80	80	80.00	80	51	61	62	58.00	175
485	80	70	70	73.33	70	45	58	56	53.00	177
486	40	40	40	40.00	50	56	62	58	58.67	106
487	70	70	70	70.00	80	41	73	79	51.00	180
488	40	30	30	33.33	20	50	78	59	62.33	123
489	50	50	50	50.00	50	60	70	77	69.00	146
490	50	40	40	43.33	50	56	68	66	63.33	176
491	60	60	60	60.00	60	52	59	54	55.00	137
492	40	30	30	33.33	30	48	49	52	49.67	129
493	40	30	30	33.33	40	61	63	63	62.33	135
494	80	60	60	66.67	40	38	45	44	42.33	123
495	70	60	50	60.00	60	52	41	59	50.67	68

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
496	60	70	70	66.67	80	49	56	56	53.67	135
497	60	60	60	50.00	50	55	68	68	63.67	157
498	40	50	50	46.67	50	52	62	62	58.67	164
499	50	40	40	43.33	40	57	66	64	62.33	140
500	60	70	60	63.33	70	59	76	76	70.33	181
501	50	40	40	43.33	40	51	52	61	54.67	140
502	60	70	70	66.67	70	48	51	52	50.33	136
503	50	60	60	56.67	60	34	58	61	51.00	146
504	40	40	40	40.00	40	45	56	54	51.67	104
505	50	40	40	43.33	40	62	72	74	69.33	169
506	40	30	30	33.33	40	52	80	74	68.67	130
507	40	30	30	36.67	40	62	70	67	66.33	141
508	40	30	30	36.67	30	55	61	65	60.33	168
509	30	30	30	30.00	50	69	82	77	76.00	146
510	40	40	40	40.00	40	41	73	73	62.33	141
511	60	60	60	60.00	50	45	53	52	50.00	139
512	60	50	50	56.67	60	45	49	52	48.67	95
513	40	30	30	36.67	50	58	59	61	59.33	119
514	50	40	40	46.67	60	58	66	63	62.33	118
515	40	30	30	36.67	40	63	62	68	64.33	195
516	50	50	50	50.00	50	55	58	66	59.67	146
517	30	20	20	26.67	30	64	68	74	69.67	156
518	30	30	30	30.00	30	58	66	72	65.33	156
519	80	80	80	80.00	90	56	75	61	64.00	123
520	40	50	50	43.33	40	55	63	58	58.67	146

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
521	40	30	30	33.33	20	46	57	59	54.00	85
522	50	50	50	50.00	30	46	46	48	46.67	85
523	40	50	50	46.67	70	51	43	43	45.67	114
524	40	40	40	40.00	50	48	41	42	43.67	114
525	40	50	40	43.33	60	61	63	54	59.33	135
526	40	40	40	40.00	40	51	54	63	56.00	118
527	60	70	70	66.67	60	56	52	54	54.00	162
528	70	60	60	63.33	70	59	54	58	57.00	134
529	60	50	50	53.33	60	51	52	46	49.67	110
530	60	60	60	60.00	50	51	42	46	46.33	123
531	60	60	60	60.00	60	55	52	59	55.33	153
532	30	20	20	23.33	20	49	54	55	52.67	133
533	30	60	50	46.67	70	76	58	59	64.33	146
534	40	40	40	40.00	40	60	49	53	54.00	138
535	70	70	70	70.00	30	49	45	41	45.00	128
536	80	80	80	80.00	40	49	40	43	44.00	121
537	50	60	60	56.67	50	49	45	52	48.67	114
538	30	30	30	30.00	20	49	40	48	45.67	138
539	50	60	60	56.67	30	45	37	43	41.67	132
540	70	60	60	63.33	70	53	45	51	49.67	130
541	80	80	80	80.00	40	33	39	48	40.00	139
542	40	40	40	40.00	60	38	47	49	44.67	77
543	80	90	90	86.67	90	35	37	54	42.67	98
544	50	50	40	46.67	40	51	52	63	55.33	141
545	70	60	60	63.33	60	53	44	49	48.67	126

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
546	30	30	30	30.00	40	39	49	58	48.67	110
547	30	30	30	30.00	30	53	54	62	56.33	121
548	30	20	20	23.33	30	43	47	54	48.00	102
549	40	40	40	40.00	50	42	45	58	48.33	114
550	40	40	30	36.67	40	49	51	60	53.33	146
551	60	70	70	66.67	70	35	51	59	48.33	120
552	80	80	80	80.00	80	42	47	48	45.67	124
553	60	50	50	53.33	30	25	41	45	37.00	49
554	30	40	40	36.67	30	39	43	43	41.67	61
555	90	80	80	83.33	40	51	58	63	57.33	85
556	80	80	80	80.00	50	41	45	48	44.67	93
557	80	80	80	80.00	70	49	52	49	50.00	70
558	80	80	80	80.00	90	38	49	51	46.00	171
559	50	60	60	56.67	60	29	38	43	36.67	61
560	70	70	60	66.67	60	41	43	51	45.00	76
561	90	90	90	90.00	90	43	43	40	42.00	77
562	90	90	90	90.00	80	43	53	48	48.00	90
563	50	40	40	43.33	40	43	52	46	47.00	33
564	60	60	60	60.00	50	35	45	48	42.67	100
565	50	50	60	53.33	70	45	42	45	44.00	73
566	80	80	70	76.67	70	43	49	54	48.67	124
567	70	70	70	70.00	60	35	38	41	38.00	100
568	70	70	70	70.00	90	28	35	37	33.33	77
569	80	80	80	80.00	80	35	38	35	36.00	85
570	50	50	50	50.00	50	39	35	46	40.00	78

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
571	60	60	50	56.67	50	35	43	48	42.00	76
572	20	20	20	20.00	20	17	32	34	27.67	57
573	80	80	80	80.00	80	35	47	53	45.00	122
574	50	50	50	50.00	50	33	34	39	35.33	79
575	80	80	80	80.00	80	37	55	50	47.33	101
576	70	70	70	70.00	80	40	43	52	45.00	91
577	80	80	80	80.00	60	43	45	49	45.67	102
578	30	30	30	30.00	30	48	33	20	33.67	42
579	60	60	60	60.00	70	37	42	49	42.67	70
580	50	50	50	50.00	40	43	52	53	49.33	91
581	50	50	50	50.00	50	63	60	61	61.33	98
582	70	70	70	70.00	70	35	38	49	40.67	97
583	60	60	60	60.00	60	35	41	46	40.67	94
584	60	50	50	53.33	50	35	47	58	46.67	120
585	60	60	60	60.00	70	38	36	40	38.00	77
586	50	50	40	46.67	60	43	46	41	43.67	110
587	60	60	60	60.00	40	48	49	51	49.33	94
588	80	80	70	76.67	80	45	47	49	47.00	106
589	50	50	50	50.00	30	35	38	40	37.67	89
590	30	30	30	30.00	40	46	60	61	55.67	115
591	70	70	70	70.00	60	37	38	36	37.00	73
592	70	60	60	63.33	60	50	58	48	52.00	114
593	90	80	80	83.33	90	43	40	49	44.00	98
594	60	60	60	60.00	40	33	40	32	35.00	75
595	70	70	70	70.00	70	35	38	35	36.00	61

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
596	80	80	80	80.00	80	43	43	48	44.67	93
597	50	50	50	50.00	50	35	45	39	39.67	97
598	80	80	80	80.00	80	53	49	59	53.67	114
599	60	60	50	56.67	60	28	34	52	38.00	95
600	80	80	80	80.00	70	53	56	49	52.67	77
601	70	70	70	70.00	50	49	49	51	49.67	102
602	90	80	80	83.33	80	49	49	50	49.33	106
603	80	80	80	80.00	70	35	38	43	38.67	85
604	50	50	40	46.67	60	37	55	53	48.33	110
604	70	70	70	70.00	70	49	49	43	47.00	98
606	80	80	80	80.00	70	37	42	41	40.00	66
607	50	40	40	43.33	50	29	53	43	38.33	64
608	60	60	60	60.00	50	39	30	43	37.33	77
609	50	50	50	50.00	50	42	43	43	42.67	70
610	80	80	80	80.00	80	33	41	41	38.33	126
611	60	60	60	60.00	70	36	33	37	35.00	77
612	80	80	80	80.00	80	41	50	41	44.00	85
613	80	80	80	80.00	80	33	35	36	34.67	83
614	50	50	50	50.00	50	31	42	41	38.00	111
615	60	60	60	60.00	70	26	48	43	39.00	126
616	60	70	70	66.67	70	39	47	39	41.67	73
617	90	90	90	90.00	40	43	48	52	47.67	129
618	50	50	50	50.00	40	42	45	42	43.00	95
619	80	80	80	80.00	80	35	38	39	37.33	96
620	90	90	90	90.00	90	30	43	39	37.33	79

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
621	90	90	90	90.00	70	35	43	39	39.00	91
622	80	80	80	80.00	50	43	45	45	44.33	114
623	70	70	70	70.00	50	35	50	42	38.00	59
624	50	50	50	50.00	50	36	47	43	42.00	94
625	70	60	60	63.33	70	61	68	71	66.67	175
626	80	70	70	73.33	70	51	51	54	52.00	150
627	60	50	40	50.00	50	60	68	66	64.67	206
628	70	70	70	70.00	60	51	68	76	65.00	219
629	40	40	40	40.00	40	43	49	51	47.67	106
630	70	70	70	70.00	70	69	72	71	70.67	198
631	60	60	60	60.00	50	62	74	70	68.67	146
632	50	50	50	50.00	60	56	54	52	54.00	123
633	50	50	50	50.00	50	48	61	58	55.67	208
634	60	50	50	53.33	60	45	52	54	50.33	90
634	50	50	50	50.00	50	53	63	61	59.00	125
636	60	60	60	60.00	60	52	54	60	55.33	157
637	50	50	40	46.67	40	66	73	75	71.33	229
638	40	40	40	40.00	40	47	53	51	40.33	146
639	40	50	50	46.67	40	63	61	66	63.33	158
640	50	40	30	40.00	50	53	64	70	74.33	190
641	40	40	40	40.00	40	53	67	66	62.00	132
642	60	50	50	53.33	60	46	60	53	53.00	139
643	50	50	50	50.00	60	50	53	52	51.67	146
644	50	60	50	53.33	50	61	62	70	64.33	188
645	70	70	70	70.00	80	49	80	55	54.00	158

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
646	60	60	60	60.00	60	45	63	59	55.67	132
647	80	80	80	80.00	90	66	62	59	62.33	171
648	40	40	40	40.00	30	71	68	76	71.67	153
649	60	70	60	63.33	80	58	66	70	64.67	148
650	70	70	70	70.00	80	41	52	57	47.33	135
651	80	80	80	80.00	90	45	52	51	49.33	154
652	60	60	50	56.67	50	66	67	80	71.00	230
653	70	60	50	60.00	80	58	82	86	75.33	175
654	80	70	60	70.00	80	75	87	92	84.67	213
655	70	70	70	70.00	70	54	56	54	53.33	153
656	30	40	40	36.67	30	56	59	66	60.33	202
657	60	60	60	60.00	70	47	53	58	52.67	146
658	70	70	70	70.00	80	58	63	75	64.33	153
659	50	40	30	40.00	40	54	59	68	60.33	158
660	50	40	40	43.33	60	51	60	55	56.67	110
661	50	50	40	46.67	40	39	42	53	44.67	94
662	70	70	70	70.00	50	49	58	63	56.67	168
663	70	70	70	70.00	90	53	61	52	55.33	118
664	50	50	50	50.00	50	66	77	82	75.33	171
665	40	40	40	40.00	30	45	49	52	48.67	153
666	60	60	60	60.00	60	58	59	61	59.33	126
667	60	60	60	60.00	70	62	72	68	67.33	180
668	40	40	40	40.00	40	57	49	60	55.33	129
669	60	60	60	60.00	60	37	43	46	42.00	146
670	60	40	40	46.67	70	50	77	64	63.67	144

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
671	50	50	50	50.00	50	50	56	61	55.67	158
672	70	70	70	70.00	70	43	52	46	47.00	146
673	70	70	70	70.00	40	43	56	52	50.33	129
674	80	80	80	80.00	80	49	54	67	56.67	172
675	50	50	50	50.00	60	43	43	48	44.67	158
676	40	50	50	46.67	50	63	67	64	64.67	127

TEST SCORES OF FORTY-EIGHT LEFTHANDED SHORTHAND STUDENTS IN THIRTY HIGH SCHOOLS OF KANSAS

Student	Quality of Writing					Speed of Writing				
	Longhand Tests				Shorthand	Longhand Tests				Shorthand
	1	2	3	Ave.	Test	1	2	3	Ave.	Test
1	70	70	70	70.00	70	51	49	46	48.66	141
2	40	40	30	36.67	30	52	48	58	52.67	162
3	70	70	70	70.00	80	55	53	60	56.00	61
4	70	60	60	63.33	50	33	31	30	31.00	68
5	50	50	40	46.67	50	33	31	27	30.33	78
6	60	50	50	53.33	60	86	52	55	64.33	141
7	50	60	50	53.33	50	80	49	59	62.67	88
8	50	50	50	50.00	30	53	51	59	54.33	83
9	50	50	50	50.00	60	52	68	54	58.00	133
10	90	90	80	86.67	90	99	42	56	65.67	98
11	50	40	40	43.67	60	56	52	52	53.33	128
12	50	40	40	43.33	70	73	82	81	78.67	190
13	50	50	50	50.00	60	41	39	43	41.00	114
14	40	40	40	40.00	40	35	48	43	42.00	96
15	50	50	50	50.00	60	40	52	54	48.67	124
16	70	70	60	66.67	70	45	61	62	56.00	139
17	30	30	30	30.00	20	34	38	40	37.33	76
18	70	70	70	70.00	80	53	52	61	55.67	147
19	50	40	40	43.33	30	56	62	69	62.33	133
20	40	30	30	33.33	30	52	45	61	52.67	146

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
21	70	70	70	70.00	40	42	36	44	40.67	110
22	30	30	20	26.67	30	45	43	44	44.00	82
23	90	90	90	90.00	80	25	22	31	26.00	59
24	40	40	40	40.00	80	49	48	51	49.33	123
25	70	70	60	66.67	70	38	38	53	43.00	106
26	20	20	20	20.00	20	65	55	65	61.67	127
27	50	40	40	43.33	20	37	36	38	37.00	93
28	50	40	40	43.33	50	35	41	51	42.33	87
29	50	60	60	56.67	70	40	36	46	40.67	115
30	50	40	40	43.33	50	37	47	56	46.67	140
31	50	50	50	50.00	50	30	38	45	37.67	130
32	60	60	50	56.67	50	45	61	49	51.67	97
33	40	40	40	40.00	30	28	38	36	34.00	128
34	40	40	40	40.00	40	51	39	43	44.33	68
35	80	70	70	73.33	70	45	58	56	53.00	177
36	40	30	30	33.33	20	50	78	59	62.33	123
37	30	30	30	30.00	50	69	82	77	76.00	146
38	40	40	40	40.00	40	51	54	63	56.00	118
39	80	90	90	86.67	90	35	39	54	42.67	89
40	90	90	90	90.00	90	43	43	40	42.00	77
41	70	70	70	70.00	60	35	38	41	38.00	100
42	70	70	70	70.00	50	49	49	51	49.67	102
43	50	50	50	50.00	50	31	42	41	38.00	111
44	50	50	50	50.00	50	53	63	61	59.00	125
45	40	40	40	40.00	30	71	68	76	71.67	153

Student	1	2	3	Ave.	Sht.	1	2	3	Ave.	Sht.
46	60	60	50	56.67	50	66	67	80	71.00	230
47	30	40	40	36.67	30	56	59	66	60.33	202
48	70	70	70	70.00	70	43	52	46	47.00	146

TEST SCORES OF FOURTEEN BOY SHORTHAND STUDENTS IN THIRTY HIGH SCHOOLS OF KANSAS

Student	Quality of Writing Longhand Tests 1	2	3	Ave.	Shorthand Test	Speed of Writing Longhand Tests 1	2	3	Ave.	Shorthand Test
1	30	30	30	30.00	60	40	66	44	50.00	132
2	40	40	40	40.00	40	42	49	54	48.33	97
3	50	50	50	50.00	50	43	49	49	47.00	102
4	50	40	40	43.33	50	99	56	49	68.00	111
5	60	60	60	60.00	60	43	59	45	50.33	130
6	30	30	30	30.00	40	46	60	58	54.67	128
7	50	50	50	50.00	70	43	45	44	44.00	115
8	30	30	30	30.00	20	34	38	40	37.33	76
9	40	40	40	40.00	40	53	46	43	47.33	94
10	40	30	30	33.33	30	45	42	43	43.67	78
11	20	20	20	20.00	20	65	55	65	61.67	127
12	40	40	40	40.00	40	51	39	43	44.33	68
13	40	40	40	40.00	40	51	54	63	56.00	118
14	70	70	70	70.00	80	40	43	52	45.00	91

September 24, 1949

CAN YOU ANSWER THESE QUESTIONS?

1. Can it be said that all lefthanded shorthand students write slower and less legibly than righthanded ones, as is the common belief?

2. Is there a relationship between longhand penmanship and shorthand writing?

3. Will writing shorthand promote defects in longhand penmanship such as improper letter formation, size and slant?

As a partial fulfillment for my master's degree at the Kansas State Teachers College, I am conducting a survey during this next school year to determine the answers to these questions.

I hope to have tests given at the beginning and at the end of the first year shorthand course. In order to obtain reliable results, it will be necessary to give these tests to at least 300-400 students. The tests will be of two types--those used to analyze the student's longhand, and those used to test the student's shorthand writing. After analyzing and comparing the results of these tests, I hope to have the information necessary to answer the question--"Is there a correlation between longhand penmanship and the ability to write shorthand?" I hope that the results of this research will be of some value to the teachers of shorthand as one of the factors to be considered in prognosticating possible success or failure in shorthand.

If you will help--please fill in the following blanks:

1. _____Number enrolled in beginning shorthand

2. _____Number enrolled in beginning shorthand who are lefthanded.

The tests will be sent to you, together with complete information for administering them. You won't have to grade or tabulate the results of the test papers. After the tests have been given, just put them in an envelope and send them back to me. That's all there is to it.

Will you cooperate in this endeavor to promote better teaching--for all shorthand teachers.

Yours very truly,

Ruth Payne

Miss Ruth Payne

RP:rp

October 22, 1949

Dear Shorthand Teacher:

I wrote you several weeks ago, asking for your cooperation in conducting a survey to determine the possible correlation between longhand penmanship and shorthand writing. Thank you for responding to my request.

The first step toward determining this possible correlation is to secure samples of handwriting. The procedure is outlined below.

The teacher should write on the board the first four sentences of Lincoln's Gettysburg Address. They are:

> "Fourscore and seven years ago our fathers brought forth upon this continent a new nation, conceived in liberty, and dedicated to the proposition that all men are created equal. Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated can long endure. We are met on a great battlefield of that war. We have come to dedicate a portion of that field as a final resting-place for those who here gave their lives that that nation might live."

Have the pupils read these sentences until they are familiar with them. They should then copy them, beginning at a given signal, and write for precisely two minutes. They should write in ink on ruled paper. The paper has been enclosed for your convenience.

After the tests have been administered, return them in the enclosed self-addressed envelope.

Yours very truly,

Ruth Payne

Miss Ruth Payne

RP:rp

October 22, 1949

Dear Shorthand Teacher:

I wrote you several weeks ago, asking for your cooperation in conducting a survey to determine the possible correlation between longhand penmanship and shorthand writing. Thank you for responding to my request.

The shorthand teachers of Kansas have been very cooperative. I have received more than a 60% response. This is well above the percentage request received on most questionnaires.

Approximately twelve hundred righthanded students and sixty lefthanded students have been offered as subjects for the tests. As I stated in my former letter, only 300-400 students will be necessary to obtain reliable results from the study. I am therefore limiting my study to those schools whose shorthand classes contain lefthanded students.

I do appreciate your interest and cooperation. I will write you the results of this survey as soon as I obtain the results.

Yours very truly,

Ruth Payne

Miss Ruth Payne

RP:rp

February 6, 1950

Dear Shorthand Teacher:

Several months ago, you administered the first of the four tests that will be given to determine the possible correlation between longhand penmanship and shorthand writing. Thank you for your splendid cooperation.

The second step toward determining this possible correlation is to secure a sample of the student's handwriting after having studied shorthand for one-half year. The procedure is outlined below.

The teacher should write on the board the first four sentences of Lincoln's Gettysburg Address.

> "Fourscore and seven years ago our fathers brought forth upon this continent a new nation, conceived in liberty, and dedicated to the proposition that all men are created equal. Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated can long endure. We are met on a great battle-field of that war. We have come to dedicate a portion of that field as a final resting-place for those who here gave their lives that that nation might live."

Have the pupils read these sentences until they are familar with them. They should then copy them, beginning at a given signal, and write for precisely two minutes. They should write in ink on ruled paper. The paper has been enclosed for your convenience.

After the tests have been administered, return them in the enclosed self-addressed envelope.

Yours very truly,

Ruth Payne

Miss Ruth Payne

RP:rp

April 15, 1950

Dear Shorthand Teacher:

Several months ago, you administered the second of the four tests that will be given to determine the possible correlation between longhand penmanship and shorthand writing. Thank you for your splendid cooperation.

The third step toward determining this possible correlation is to secure a sample of the student's handwriting after having studied shorthand for a year. The procedure is outlined below:

The teacher should write on the board the first 4 sentences of Lincoln's Gettysburg Address.

> "Fourscore and seven years ago our fathers brought forth upon this continent a new nation, conceived in liberty, and dedicated to the proposition that all men are created equal. Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated can long endure. We are met on a great battle-field of that war. We have come to dedicate a portion of that field as a final resting-place for those who here gave their lives that that nation might live."

Have the pupils read these sentences until they are familiar with them. They should then copy them, beginning at a given signal, and write for precisely two minutes. They should write in ink on ruled paper. The paper has been enclosed for your convenience.

The last step in this study is to secure a sample of the student's shorthand writing. They should write in ink on the tests that are enclosed for this purpose. Have the students copy the shorthand on the lines provided for precisely two minutes. After both sets of tests have been administered, return them in the enclosed self-addressed envelope.

Thank you for your cooperation in this study. I will write you the results of the survey as soon as they have been determined.

Yours very truly,

Ruth Payne

Miss Ruth Payne

RP:rp

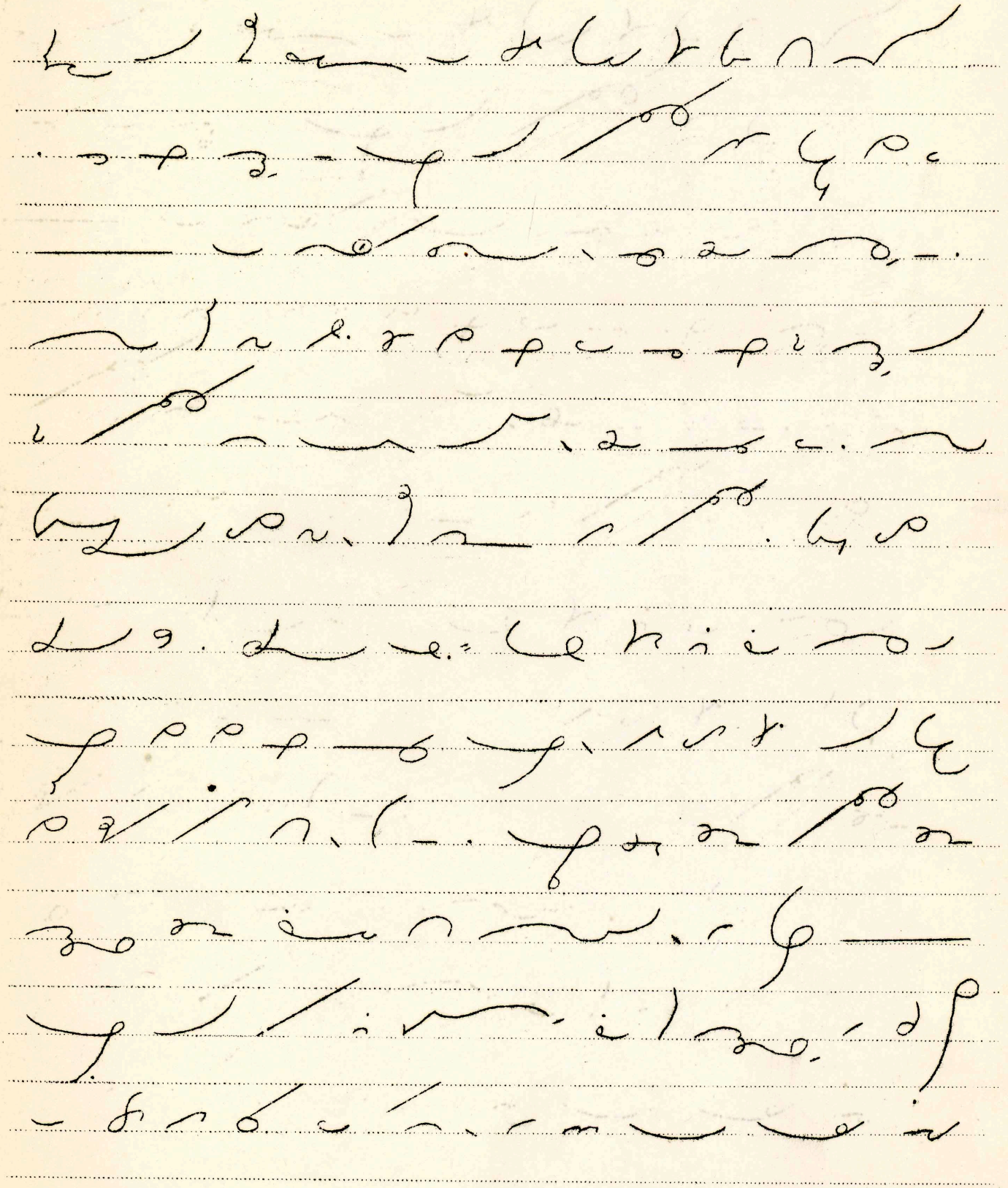
	96-100	91-95	86-90	81-85	76-80	71-75	66-70	61-65	56-60	51-55	46-50	41-45	36-40	31-35	26-30	21-25	16-20
240-249																	
230-239																	
220-229																	
210-219																	
200-209																	
190-199																	
180-189																	
170-179																	
160-169																	
150-159																	
140-149																	
130-139																	
120-129																	
110-119																	
100-109																	
90- 99																	
80- 89																	
70- 79																	
60- 69																	
50- 59																	
40- 49																	
30- 39																	
20- 29																	

NAME_____ LEFT-HANDED_____

BOY_____ GIRL_____ RIGHT-HANDED_____

NAME_____ LEFT-HANDED_____

BOY_____ GIRL_____ RIGHT-HANDED_____



NAME	ABSENT THE DAY TEST WAS GIVEN	NO LONGER ENROLLED IN SHORTHAND		LEFT SCHOOL		OTHER REASON
		SUBJECT TOO DIFFICULT	CHANGE OF CURRICULUM	ENROLLED IN ANOTHER SCHOOL	LEFT SCHOOL ENTIRELY	